Route 53 Corridor Transportation Plan

A report by the

Central Transportation

Planning Staff for the

Massachusetts Highway

Department

Route 53 Corridor Transportation Plan

Author
Robert Sievert

Contributing Analysts
Efi Pagitsas
Alicia Wilson

Data Collection
Hiral Gandhi
Tom Nixon
Katharine Wall

Geographic Information Systems
Mark Scannell
Kathy Jacob
Paul Reim

Photography
Carol Gautreau Bent

Cover Design
Jane M. Gillis

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Central Transportation Planning Staff
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Study area

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INTRODUCTION

This report presents the Route 53 Corridor Transportation Plan: a set of recommended transportation improvements within and near the Route 53 corridor. The development of this plan was prompted by findings in the Boston Region Metropolitan Planning Organization's 2000 Congestion Management System report.[1] In that report, a number of instances of mobility problems were identified in the study area for this plan, which is shown in Figure 1.

The recommended transportation improvements for the 35.6-kilometer (22.1-mile) Route 53 corridor in this plan are multimodal in nature and include new traffic signals, additional travel lanes, exclusive turning lanes, raised medians, sidewalks, crosswalks, and wider striped shoulders that would enhance the safety of bicycle travel as well as of vehicle operations. Other suggested improvements, not for Route 53 proper but indirectly affecting travel in the Route 53 corridor, include added parking spaces at commuter rail stations and at the Hingham shipyard commuter boat terminals, traffic-calming measures on side streets, and increased public transportation services.

The body of this report summarizes the suggested improvements and other important findings of the work that was conducted to develop the plan; it also presents some of the data collected. Information pertaining to the procedures and timing of implementation of improvements is provided as well. Most of the subjects treated in the body of the report are covered in greater detail in the appendices.

The work was conducted with the participation of the Route 53 Corridor Transportation Plan Advisory Group, whose members included local officials, representatives of transportation and planning agencies, and state legislators. Appendix F lists the members of the group and provides additional information on their participation.

Transportation Modes, Land Use, and the Nature of Route 53

In this plan, there is an emphasis on multimodal transportation improvements to be implemented over a period of time. Providing improvements solely for automobile traffic, such as widening the Route 53 roadway and increasing capacity at intersections, would fall short in the

[1] Central Transportation Planning Staff for the Boston Region Metropolitan Planning Organization, *Mobility in the Boston Region: The 2000 Congestion Management System Report: Existing Conditions and Next Steps,* Volume 6: *SSC,* November 2000.

overall effort in the South Shore area to reduce congestion and to improve travel conditions in general.

Land use development and transportation improvements should not occur independently. They need to be looked at together, in an integrated and coordinated way, so that residential developments and employment centers are accessed not only by automobile users, but also by pedestrians, bicyclists, and users of public transportation. The *Urban Transportation Monitor* has stated, with respect to higher-density development and smart growth/sustainable development, that one vital component often lacking has been "the preservation of right-of-way for modes other than highways. Without this, there is not much hope for a reduction in traffic congestion and an improvement in the quality of urban transportation. Higher density development has to be accompanied by improved accessibility and some form of high quality public transportation."[2]

These accompaniments have been present to some degree on the South Shore in recent years with the restoration of two of the three branches of the Old Colony commuter rail line, the Kingston/Plymouth and Lakeville/Middleborough Lines. Commuter rail restoration is scheduled to continue during the next few years, as the third branch of the Old Colony Line, the Greenbush Line, becomes operational by 2006. As with the first two lines, it is expected that the Greenbush Line will eventually contribute to a positive change in travel patterns, particularly by reducing automobile work trips between the South Shore and Boston. Many current long door-to-door automobile work trips will be converted to shorter feeder trips to local commuter rail stations.

The Route 53 Corridor Transportation Plan supports the notion that Route 53 should remain what could be called a "subregional Main Street." The roadway parallels the limited-access, four- or six-lane Route 3 highway for most of its length, and it ought not to become a competing linehaul alternative. Instead, this plan recommends transportation improvements which help to relieve congestion points and improve safety on Route 53. The plan also recommends measures which improve access to and from commercial driveways, as well as measures which enhance connections to Route 3 interchanges. At the same time, it does not recommend improvements which would be expected to raise overall travel speeds on Route 53.

[2] *Urban Transportation Monitor,* editorial, April 13, 2001, p. 8.

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Study area

FIGURE 1
Study Area

TRANSPORTATION CONCERN IDENTIFICATION

The study area extends from Quincy in the north to Kingston in the south, passing through seven other South Shore communities. The land use abutting the roadway varies throughout. In general, development is more dense in the communities closer to Boston, while less so in the southern half of the area. Two-way daily traffic volumes on Route 53 also vary throughout the corridor, ranging from around 6,000 at the Pembroke/Duxbury line to about 33,000 at the Braintree/Weymouth line.

Because of varying land uses and traffic levels, transportation issues and concerns are different in each community. CTPS already had some information on what some of the corridor's transportation concerns were, acquired in the course of other studies and through field observation. Additional information was solicited from local officials in the towns abutting Route 53 about intersections and other locations with poor traffic operations, safety deficiencies, or lack of proper signage, about pedestrian and bicycle concerns, and about the lack of park-and-ride facilities and public transportation services.

The transportation concerns examined included:

- Congestion, poor traffic operations, and/or the frequency of vehicle crashes at major Route 53 intersections, including (from north to south):
  - East/West Howard Street intersection (Quincy)
  - The #200–299 blocks of Quincy Avenue (Route 53) (Braintree)
  - The #400–499 blocks of Quincy Avenue (Route 53) (Braintree)
  - Pleasant Street intersection (Weymouth)
  - Derby Street/Gardner Street intersection (Hingham)
  - East Street intersection (Hanover)
  - Broadway intersection (Hanover)
  - Pleasant Street intersection (Pembroke)
  - Winter Street intersection (Duxbury)
  - Tar Kiln Road intersection (Kingston)
- Cut-through traffic in local neighborhoods that is attempting to bypass congested Route 53 intersections (in Hingham and Norwell)
- Lack of sidewalks or presence of inferior curb cuts along some sections of Route 53 (in Braintree, Weymouth, Hingham, Hanover, and Pembroke)
- Lack of public transportation throughout the Route 53 corridor

Information was developed by CTPS, in conjunction with local officials, on these and other congestion, mobility, and safety concerns in the corridor. All locations with concerns were investigated, level-of-service analyses were performed wherever appropriate, field surveys were made to better understand the issues, and the results were summarized in technical memoranda. These memoranda were distributed to, and discussed at meetings with, the Route 53 Corridor Transportation Plan Advisory Group.

The following section details the data collection effort which supported both the identification of transportation concerns and the development of a set of recommended improvements for the corridor. The succeeding section presents those improvements.

DATA COLLECTION

The Route 53 corridor was analyzed primarily through the interpretation of many forms of travel data. Data were collected in the field by CTPS staff, as well as gleaned from previous traffic studies conducted in the corridor. Traffic simulation modeling was not deemed necessary, because it was anticipated at the outset that the corridor's transportation concerns would not call for improvement measures of a very diversionary nature.

The collected data, described below, formed the basis for analyzing traffic operations at intersections, both signalized and unsignalized. They were also used in identifying locations where crashes tend to occur, as well as areas where pedestrian, bicycle, and public transportation facilities should be enhanced.

The data may be categorized as follows:

Traffic Counts and Projections

Manual AM and PM peak period turning movement counts (MTMCs) at signalized and unsignalized intersections in the Route 53 corridor were key data used. By means of these counts, it was possible to determine at the key intersections in the corridor both the magnitude of congestion through measurement of queues and the levels of service of traffic operations.

The MTMCs were obtained from environmental impact reports (EIRs) and traffic studies conducted by private consultants, from the Old Colony Planning Council, and from local communities' traffic departments; they were also conducted by CTPS. In addition, twenty-four-hour automatic traffic recorder counts were obtained, mainly from the Massachusetts Highway Department, the Old Colony Planning Council, Norfolk County, and numerous EIRs and traffic studies performed for specific developments in the corridor. A few of the MTMCs were performed specifically to help determine the percentage of trucks in the traffic stream at certain locations (these percentages are given in the following subsection). The various counts used are summarized in Appendix B.

Traffic volume projections were created for the years 2005 and 2025 for use in the LOS analyses that were conducted to estimate the operational merits of suggested roadway improvements. The projections were based on trends in AM and PM peak period traffic growth during the 1980s and 1990s at numerous locations in the corridor, on population and employment forecasts produced by the Metropolitan Area Planning Council, and on the background growth estimates found in recent EIRs and traffic studies for local development projects.

From these sources, the following future growth estimates for Route 53 peak period traffic were developed. In Quincy, Braintree, Weymouth, and Hingham, traffic was projected to grow by *0.5% per year*, or 2.5% between 2000 and 2005 and 13.3 % between 2000 and 2025, compounded. In Norwell, Hanover, Pembroke, Duxbury, and Kingston, the projected growth was *1.0% per year*, or 5.1% between 2000 and 2005 and 28.2% between 2000 and 2025, compounded. For more details, see Appendix C-1.

Trucks

The primary source of information on the level of truck traffic in the corridor was MTMCs. The following table summarizes, by location from north to south, the percentage of trucks in the traffic stream in the AM and PM peak periods:

Route 53 Intersection	% Trucks AM Peak Period	% Trucks PM Peak Period	Source(s)[3]
East/West Howard St. (Quincy)	3.7	1.1	CTPS
Hayward St. (Braintree)	2.1	1.1	FS&T
Commercial St. (Braintree)	4.4	2.0	FS&T
Middle St. (Weymouth)	4.9	1.1	AM: CTPS, PM: HTSD
Rte. 228 (Hingham/Norwell)	–	0.8	Vanasse Assoc.
Grove St./High St. (Norwell)	5.4	0.5	AM: CTPS, PM: Vanasse Assoc.
Rte. 123 (Hanover)	2.1	1.0	HTSD
Rte. 3 ramps (Hanover)	1.9	0.8	HTSD
Old Washington St. (Hanover)	1.1	0.9	HTSD
East St. (Hanover)	1.7	1.3	CTPS
Rte. 139 (Hanover)	1.6	1.0	HTSD
Broadway (Hanover)	1.9	1.1	HTSD
Rte. 139 (Pembroke)	1.9	0.9	HTSD
Water St. (Pembroke)	4.1	1.0	CTPS
Pleasant St. (Pembroke)	5.4	2.6	CTPS
Winter St. (Duxbury)	3.5	1.8	CTPS
Silver Birch Ln. (Kingston)	3.4	1.8	CTPS
Tar Kiln Rd. (Kingston)	6.3	2.2	CTPS

Crash Data/Diagrams

A key goal of the plan, together with reducing congestion and increasing mobility, was to develop strategies which increase safety in the corridor. It was vital to gather data on vehicle crashes at key intersections, for use in achieving a better understanding of both the patterns and the causes of crashes at the various locations. Once this understanding was reached, it was possible to develop improvement strategies that reduce the likelihood of crashes.

[3] FS&T: Fay, Spofford and Thorndike. HTSD: Highway & Traffic Signal Design, Inc. (HTSD was recently renamed Greenman and Pederson).

Two sources of data were utilized in addition to the general data contained in the EIRs and traffic studies. The CTPS Geographic Information Systems/Data Resources section provided information on collisions in the corridor as summarized by the Massachusetts Registry of Motor Vehicles. Data were also obtained from the local police departments. Summaries were created for such characteristics as crash type (e.g., rear-end, head-on, angle); crash severity (property damage, personal injury, fatality); time of day; day of week; and pavement, light, and weather conditions. Crash diagrams based on a total of 217 individual crashes were constructed for nine key locations in the corridor as well. The crash data are provided in Appendix B.

Other Data

Numerous other types of transportation data were collected in the Route 53 corridor and used in the analysis of traffic conditions. These included:

Travel times. These were obtained from CTPS's Congestion Management System database for 1996–97 and for 2001 (they are presented in Appendix B).

Signalized intersection characteristics. For key signalized intersections in the study area, the following data were compiled through field observation and/or from signal permits: cycle length; phasings; green, yellow, and red time by approach; pedestrian buttons and phasings; queue lengths.

Existence of sidewalks. Field work was performed to inventory sidewalks in the corridor. The existence or absence of sidewalks along both sides of the roadway was noted, as were the approximate lengths of the existing sidewalks (see Appendix C).

Striped shoulder widths. Field work was performed to inventory striped shoulder widths in the corridor. The existence or absence of striped shoulders along both sides of the roadway was noted, as were the existing shoulder widths (see Appendix C).

Town-of-origin data. From a survey of license plates of vehicles on Route 53 at four locations during the AM peak period, it was possible to determine the origin-town profile of the roadway's users (Appendix D).

"Windshield survey" data. Other aspects of existing conditions that CTPS personnel compiled information on through observation in the field were posted speed limits, signage, crosswalks, number of curb cuts, and sight distance deficiencies. Potential service-road locations were also noted.

IDENTIFICATION OF POTENTIAL IMPROVEMENT MEASURES AND DEVELOPMENT OF RECOMMENDATIONS

Based on analysis of the data collected on the nine abutting communities' transportation concerns and their context in the Route 53 corridor, CTPS identified potential measures for addressing the concerns. Also, Route 53 Corridor Transportation Plan Advisory Group members were asked for input on potential measures, to supplement CTPS's analyses.

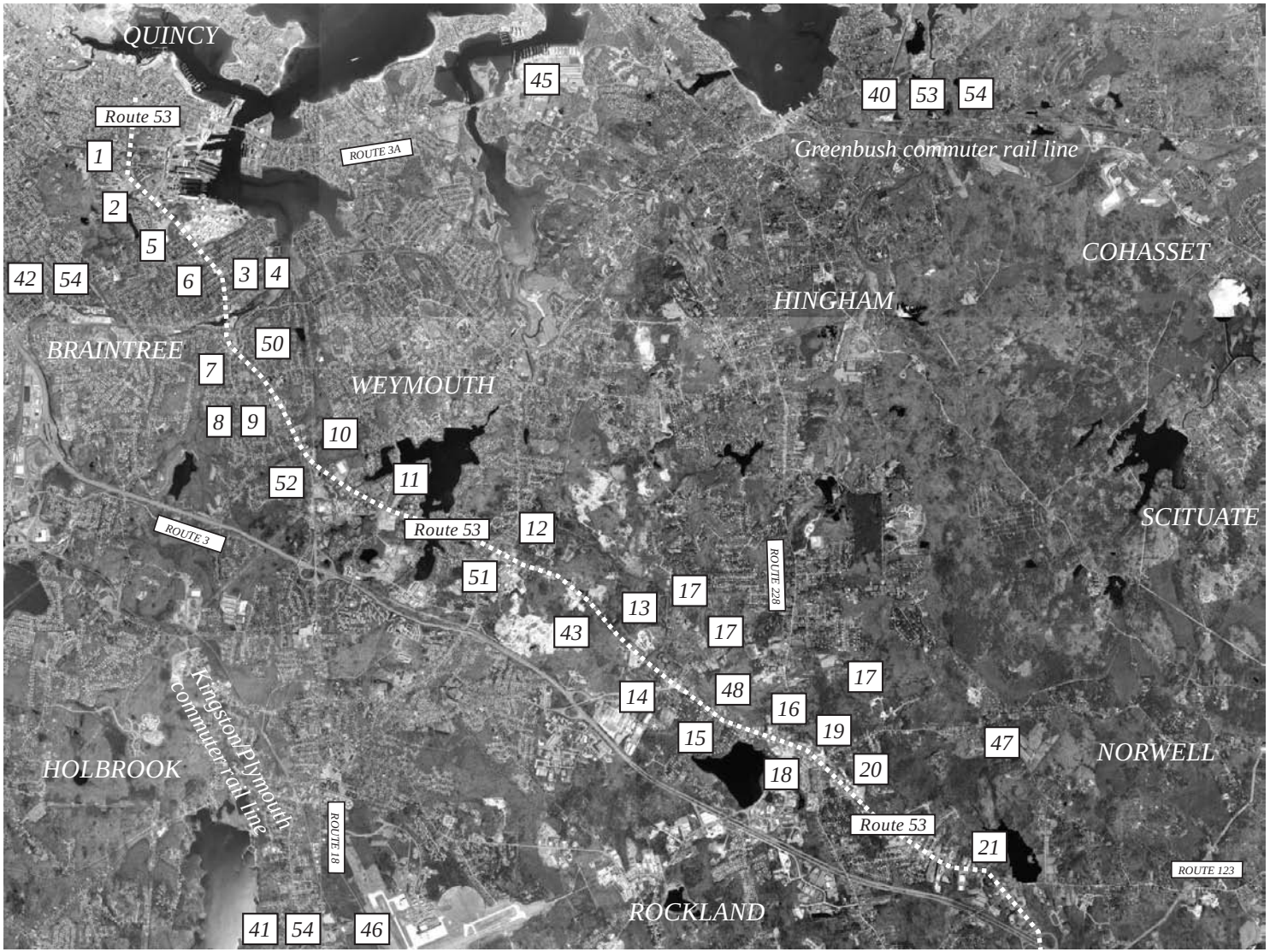
CTPS summarized the identified transportation concerns and the recommended improvement measures in two respective technical memoranda, which were distributed to the Advisory Group for comment. Taking into consideration the comments received, CTPS adjusted many of the improvement measures and developed a final set of recommendations.

Each of the recommendations corresponds to a particular location of concern that had been identified in the corridor, except for a few that address types of concern associated with multiple or generalized locations. Some recommendations consist of a single improvement measure, some of two or more measures. The measures are of the following types:

Access points added
Aesthetic improvements
Bicycle improvements
Crash reduction
Congestion reduction
Curb cut improvements
Intersection geometry improvements
Park-and-ride improvements
Pedestrian improvements
Public transportation improvements
Restriction of traffic
Roadway resurfacing/shoulder widening
Signage improvements
Signal installation/upgrading
Signal timing improvements
Speed limit enforcement
Traffic calming
Turning lane/travel lane added

Figure 2 shows the locations of the recommended improvements. Table 1 summarizes the recommendations, indicating the improvement type(s), giving the location and a brief description, and stating which entity has jurisdiction. If a recommended improvement is in the Boston Region Metropolitan Planning Organization (MPO) Transportation Improvement Program (TIP), the table gives its status in that program; for other improvements, the table suggests when implementation should take place. Some can be implemented independently, while others should be implemented in conjunction with other, larger transportation or development projects. The descriptions of improvements in Table 1

cross-reference Appendix C, where a more complete discussion of each improvement may be found. Included in the improvements described in the table, along with those generated in this plan, are measures that had been generated previously, such as mitigation measures for development projects.



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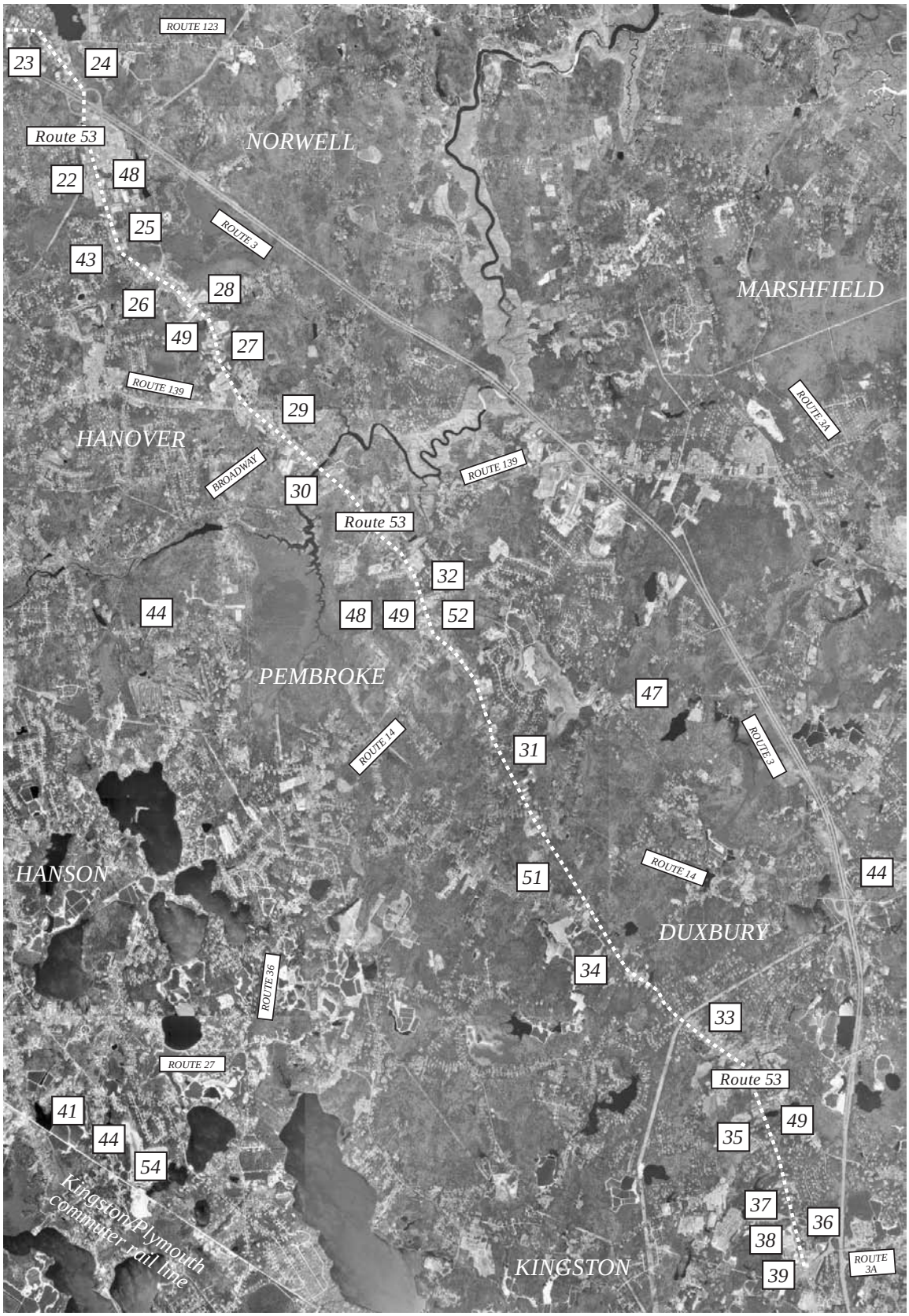
Aerial photo source: MassGIS and MIT

FIGURE 2a
Northern Portion of Study Area: Locations with Recommended or Already-Planned Transportation Improvements
(For descriptions, by improvement #, refer to Table 1)



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Aerial photo source: MassGIS and MIT

FIGURE 2b
Southern Portion of Study Area:
Locations with Recommended or Already-Planned Transportation Improvements
(For descriptions, by improvement #, refer to Table 1)

TABLE 1
Recommended Transportation Improvements
Route 53 Corridor

City, Town	Improvement # (refer to Figure 2)	Improvement Type(s)	Route 53 Location/Description *(For complete description, see Appendix C, page...., Figure....)*	Jurisdiction	Status in Transportation Improvement Program (TIP)/Recommended Sequencing
Quincy	1	Bicycle improvements Roadway resurfacing/ shoulder widening	*On Route 53 throughout Quincy* Restripe the lanes so that, wherever possible or when future roadway reconstruction occurs, a 2.5 m (8 ft)-wide shoulder is added to both sides of the roadway. *(.....page 4)*	City of Quincy	At the time of roadway reconstruction
	2	Bicycle improvements Collision reduction Congestion reduction Intersection geometry improvements Turning lane/travel lane added	*At East/West Howard Street* Realign intersection; add exclusive left-turn lanes on East/West Howard Street; add movable gates at the nearby railroad crossings; add loop detectors, signs, and markings for bicyclists *(.....page 4, Figure C-3)*	City of Quincy Fore River Railroad	To be done in anticipation of the Fore River Shipyard redevelopment, or as part of mitigation
Braintree	3	Bicycle improvements Roadway resurfacing/ shoulder widening	*On Route 53 throughout Braintree* Restripe the lanes so that, wherever possible or when future roadway reconstruction occurs, a 2.5 m (8 ft)-wide shoulder is added to both sides of the roadway. *(.....page 9)*	MassHighway	At the time of roadway reconstruction
	4	Aesthetic improvements Curb cut improvements Pedestrian improvements	*On Route 53 throughout Braintree* When future reconstruction occurs, upgrade and widen sidewalks on both sides of the roadway to 2 m (6 ft). Consolidate curb cuts to commercial properties; make entry and exit driveways more defined. *(.....page 9)*	Town of Braintree MassHighway	At the time of roadway reconstruction
	5	Crash reduction Signal installation Speed limit enforcement	*In the # 400-499 blocks* Enforce the posted speed limit; install a flashing beacon at the Dunkin' Donuts/Viking Club driveways. *(.....page 11)*	State Police Braintree Police Town of Braintree MassHighway	Continuous (speed limit enforcement); as soon as feasible (beacon)
	6	Signage improvements Signal installation/upgrading Speed limit enforcement	*In the #200-299 blocks* Enforce the posted speed limit; replace old signal heads with new LED heads at Bickford Road; add signs warning drivers of signals at Bickford Road and at Hayward Street. *(.....page 12)*	State Police Braintree Police MassHighway	Continuous (speed limit enforcement); as soon as feasible (other improvements)

(R. Sievert, 031103, 53Recms.xls)

TABLE 1 (cont.)
Recommended Transportation Improvements
Route 53 Corridor

City, Town	Improvement # (refer to Figure 2)	Improvement Type(s)	Route 53 Location/Description *(For complete description, see Appendix C, page...., Figure....)*	Jurisdiction	Status in Transportation Improvement Program (TIP)/Recommended Sequencing
Braintree/ Weymouth line	7	Aesthetic improvements Congestion reduction Park-and-ride improvements Pedestrian improvements Public transportation improvements	*Commercial Street near the Braintree/Weymouth line* Provide grade separation where Route 53 crosses the Greenbush Line; build a connector road between Quincy Avenue (Braintree) and Commercial Street (Weymouth); provide parking at Weymouth Landing station; create a new pedestrian trail and park. *(.....page 13)*	Town of Braintree Town of Weymouth MassHighway MBTA	To be done as mitigation for Greenbush commuter rail line restoration
Weymouth	8	Bicycle improvements Roadway resurfacing/ shoulder widening	*On Route 53 in Weymouth* Restripe the lanes when future roadway reconstruction occurs, to add a 2.5 m (8 ft)-wide shoulder to both sides of the roadway, especially at two locations. *(.....page 13)*	Town of Weymouth MassHighway	At the time of roadway reconstruction
	9	Aesthetic improvements Curb cut improvements Pedestrian improvements	*On Route 53 in Weymouth* When future reconstruction occurs, upgrade and widen sidewalks on both sides of the roadway to 2 m (6 ft). Consolidate curb cuts to commercial properties; make entry and exit driveways more defined. *(.....page 15)*	Town of Weymouth MassHighway	At the time of roadway reconstruction
	10	Bicycle improvements Crash reduction Intersection geometry improvements Pedestrian improvements Signal timing improvements Turning lane/travel lane added	*At Route 18 (Main Street)* Intersection widening, restriping. New traffic signal phases. New pedestrian crossings, pushbuttons. Addition of loop detectors, signs, and markings for bicyclists. *(.....page 15, Figure C-6)*	MassHighway	Improvements were completed in 2002 as part of CVS drugstore and Avalon Ledges apartments mitigation
	11	Crash reduction Congestion reduction Pedestrian improvements Signal timing improvements Turning lane/travel lane added	*At Middle Street* Create new exclusive left-turn lanes and signal phase. Extend receiving lanes. Restripe crosswalks and provide pushbuttons. *(.....page 18, Figure C-7)*	MassHighway	Listed in the "Supplemental List of Projects" section of the TIP. To be done as mitigation for Walgreens and Stop and Shop developments

(R. Sievert, 031103, 53Recms.xls)

TABLE 1 (cont.)
Recommended Transportation Improvements
Route 53 Corridor

City, Town	Improvement # (refer to Figure 2)	Improvement Type(s)	Route 53 Location/Description *(For complete description, see Appendix C, page...., Figure....)*	Jurisdiction	Status in Transportation Improvement Program (TIP)/Recommended Sequencing
Weymouth (cont.)	12	Bicycle improvements Crash reduction Restriction of traffic Signal timing improvements	*At Pleasant Street* Adjust signal phases and timings. Add signage prohibiting left turns from adjacent commercial driveways. Add loop detectors, signs, and markings for bicyclists. *(.....page 20, Figure C-8)*	MassHighway	Possibly as mitigation for the Erickson Retirement Community
Hingham	13	Access points added Pedestrian improvements Public transportation improvements Signal timing improvements Turning lane/travel lane added	*West of Old Ward Street* Provide new driveway from senior housing site to Route 53. Add exclusive left- and right-turn lanes. Sidewalks added at the housing site, as well as a shuttle bus for employees and residents to local service destinations. Add turning lanes at Cushing Street intersection. Upgrade signal timing at Cushing Street and Derby Street/Gardner Street intersections. *(.....page 23, Figure C-10)*	MassHighway	To be done as mitigation for the Erickson Retirement Community
	14	Bicycle improvements Crash reduction Congestion reduction Restriction of traffic Signal timing improvements Turning lane/travel lane added	*At Derby Street/Gardner Street* Adjust signal timings. Widen Route 53 north of the intersection. Consider adding a raised median on Gardner Street east of Route 53. Add loop detectors, signs, and markings for bicyclists. *(.....page 26, Figure C-11)*	Town of Hingham MassHighway	Part to be done as mitigation for the Erickson Retirement Community; part to be done as soon as feasible, or possibly as mitigation for the SWNAS redevelopment
	15	Bicycle improvements Roadway resurfacing/ shoulder widening	*On Route 53 in Hingham* Restripe the lanes when future roadway reconstruction occurs, to add a 2.5 m (8 ft)-wide shoulder to both sides of the roadway, especially between Derby Street/Gardner Street and Queen Anne's Corner. *(.....page 29)*	MassHighway	At the time of roadway reconstruction

TABLE 1 (cont.)
Recommended Transportation Improvements
Route 53 Corridor

City, Town	Improvement # (refer to Figure 2)	Improvement Type(s)	Route 53 Location/Description *(For complete description, see Appendix C, page...., Figure....)*	Jurisdiction	Status in Transportation Improvement Program (TIP)/Recommended Sequencing
Hingham/ Norwell	16	Crash reduction Congestion reduction Intersection geometry improvements Signal timing improvements Turning lane/travel lane added	*At Route 228 (Main Street), Queen Anne's Corner* Add exclusive left-turn lanes. Widen current travel lanes to standard widths. Upgrade signal phase sequence plan. *(.....page 30, Figure C-13)*	MassHighway	Programmed for FY 2004
	17	Speed limit enforcement Traffic calming	*On local roadways near Queen Anne's Corner* Enforce the posted speed limit; consider installing traffic-calming measures such as neighborhood traffic circles or speed tables. *(.....page 33)*	Town of Hingham Town of Norwell	As soon as feasible
Norwell	18	Turning lane/travel lane added	*Between Queen Anne's Corner and Grove Street/High Street* Widen the roadway to a three-lane cross section: a travel lane in each direction and a two-way center left-turn lane. *(.....page 35, Figures C-14)*	MassHighway	Programmed for FY 2004
	19	Bicycle improvements Roadway resurfacing/ shoulder widening	*Between Queen Anne's Corner and Grove Street/High Street* As part of the roadway widening in improvement #18, provide striped shoulders 1.8 m (6 ft) wide outside the travel lanes. *(.....page 37)*	MassHighway	Programmed for FY 2004
	20	Intersection geometry improvements Pedestrian improvements Turning lane/travel lane added	*At Grove Street/High Street* Add exclusive left-turn lanes; widen intersection to standard-width lanes; add crosswalks. *(.....page 37, Figures C-15)*	MassHighway	Programmed for FY 2004
	21	Access points added Pedestrian improvements Signal installation/upgrading Turning lane/travel lane added	*At Jacob's Trail* A new driveway to/from Stop and Shop; a new traffic signal; intersection widening with new travel lanes and exclusive left-turn lanes; crosswalks and an exclusive pedestrian signal phase. *(.....page 39, Figures C-16)*	MassHighway	Improvements were completed in 2002 as part of Stop and Shop mitigation

TABLE 1 (cont.)
Recommended Transportation Improvements
Route 53 Corridor

City, Town	Improvement # (refer to Figure 2)	Improvement Type(s)	Route 53 Location/Description *(For complete description, see Appendix C, page...., Figure....)*	Jurisdiction	Status in Transportation Improvement Program (TIP)/Recommended Sequencing
Hanover	22	Bicycle improvements Roadway resurfacing/ shoulder widening	*On Route 53 throughout Hanover* Restripe the lanes so that, wherever possible or when future roadway reconstruction occurs, a 2.5 m (8 ft)-wide shoulder is added to both sides of the roadway. *(.....page 41)*	MassHighway	At the time of roadway reconstruction
	23	Crash reduction Pedestrian improvements Signal installation/upgrading Turning lane/travel lane added	*At Route 123 (Webster Street)* An upgraded traffic signal; intersection widening with new travel lanes and turning lanes; new sidewalks and crosswalks. *(.....page 43, Figure C-18)*	MassHighway	Improvements were completed in 2002 as part of Stop and Shop mitigation
	24	Bicycle improvements Congestion reduction Pedestrian improvements Roadway resurfacing/ shoulder widening Turning lane/travel lane added	*Between Route 123 and Route 3* Widen the roadway to a three-lane cross section with a travel lane in each direction and a two-way center left-turn lane, OR to a four-lane cross section with two travel lanes in each direction; add 1.2 m (4 ft)-wide shoulders plus sidewalks on each side; add a new traffic signal at the Route 3 northbound intersection with Route 53. *(.....page 45, Figures C-19, C-20)*	MassHighway	Improvements proposed for Town of Hanover's consideration, as part of the Stop and Shop mitigation
	25	Bicycle improvements Congestion reduction Pedestrian improvements Roadway resurfacing/ shoulder widening Turning lane/travel lane added	*Between Mill Street and Rawson Road* Widen the roadway to a five-lane cross section, including two travel lanes in each direction and a two-way center left-turn lane; add 1.2 m (4 ft)-wide shoulders on both sides; add a 1.8 m (6 ft)-wide sidewalk on the northbound side of Route 53. *(.....page 48, Figure C-21)*	MassHighway	Listed in the "Supplemental List of Projects" section of the TIP. To be done in conjunction with possible Route 3 widening.
	26	Congestion reduction Intersection geometry improvements Signal installation/upgrading Turning lane/travel lane added	*At Old Washington Street* Realign Pond Street so it aligns with Old Washington Street at Route 53; upgrade the traffic signal; widen intersection and add exclusive left- and right-turn lanes. *(.....page 50, Figure C-22)*	MassHighway	Listed in the "Supplemental List of Projects" section of the TIP. To be done in conjunction with Route 3 widening.

TABLE 1 (cont.)
Recommended Transportation Improvements
Route 53 Corridor

City, Town	Improvement # (refer to Figure 2)	Improvement Type(s)	Route 53 Location/Description *(For complete description, see Appendix C, page...., Figure....)*	Jurisdiction	Status in Transportation Improvement Program (TIP)/Recommended Sequencing
Hanover (cont.)	27	Congestion reduction Pedestrian improvements Turning lane/travel lane added	*Between Rawson Road and Route 139 (Rockland Street)* Widen the roadway to a five-lane cross section, including two travel lanes in each direction and an unpaved median with room for left turns and U-turns; add 0.6 m (2 ft)-wide shoulders on both sides; add a 1.8 m (6 ft)-wide sidewalk on the northbound side of Route 53. *(.....page 52, Figure C-23)*	MassHighway	At the time of roadway reconstruction
	28	Bicycle improvements Congestion reduction Pedestrian improvements Signal installation/upgrading Turning lane/travel lane added	*At East Street* Install a traffic signal and provide an exclusive pedestrian phase; provide crosswalks; widen intersection to include additional travel and turning lanes; add loop detectors, signs, and markings for bicyclists. *(.....page 54, Figure C-24)*	MassHighway	As soon as feasible
	29	Bicycle improvements Crash reduction Congestion reduction Restriction of traffic Signal timing improvements Turning lane/travel lane added	*At Broadway* Widen the intersection and add exclusive left- and right-turn lanes; change the signal timings and phasings; propose closing of one driveway at an adjacent bank; add loop detectors, signs, and markings for bicyclists. *(.....page 56, Figure C-25)*	Town of Hanover MassHighway	As soon as feasible
Hanover/ Pembroke	30	Bicycle improvements Congestion reduction Pedestrian improvements Roadway resurfacing/ shoulder widening Turning lane/travel lane added	*Between Broadway (Hanover) and Schooset Street (Pembroke)* Widen the roadway to a four-lane cross section, including two travel lanes in each direction and 2.5 m (8 ft)-wide shoulders on both sides; add a 1.8 m (6 ft)-wide sidewalk on the northbound side. *(.....page 59, Figure C-26)*	MassHighway	At the time of roadway reconstruction, or to be done prior to possible Route 3 widening
Pembroke	31	Bicycle improvements Roadway resurfacing/ shoulder widening	*On Route 53 throughout Pembroke* Restripe the lanes so that, wherever possible or when future roadway reconstruction occurs, a 2.5 m (8 ft)-wide shoulder is added to both sides of the roadway. *(.....page 60)*	MassHighway	At the time of roadway reconstruction

(R. Sievert, 031103, 53Recms.xls)

TABLE 1 (cont.)
Recommended Transportation Improvements
Route 53 Corridor

City, Town	Improvement # (refer to Figure 2)	Improvement Type(s)	Route 53 Location/Description *(For complete description, see Appendix C, page...., Figure....)*	Jurisdiction	Status in Transportation Improvement Program (TIP)/Recommended Sequencing
Pembroke (cont.)	32	Bicycle improvements Crash reduction Congestion reduction Pedestrian improvements Signal installation/upgrading Turning lane/travel lane added	*At Pleasant Street* Install a traffic signal and provide an exclusive pedestrian phase; provide crosswalks; widen intersection to include additional travel and turning lanes; add loop detectors, signs, and markings for bicyclists; add sidewalks north and south of the intersection. *(.....page 63, Figure C-28)*	Town of Pembroke MassHighway	As soon as feasible
Duxbury	33	Bicycle improvements Roadway resurfacing/ shoulder widening	*On Route 53 throughout Duxbury* Restripe the lanes so that, wherever possible or when future roadway reconstruction occurs, a 2.5 m (8 ft)-wide shoulder is added to both sides of the roadway. *(.....page 66)*	MassHighway	At the time of roadway reconstruction
	34	Intersection geometry improvements	*At High Street* Realign High Street so it intersects with Route 53 at a right angle. *(.....page 66, Figure C-30)*	Town of Duxbury MassHighway	As soon as feasible
	35	Bicycle improvements Crash reduction Pedestrian improvements Signal installation/upgrading	*At Winter Street* Install a traffic signal and provide an exclusive pedestrian phase; provide crosswalks; add loop detectors, signs, and markings for bicyclists. *(.....page 66, Figure C-31)*	MassHighway	Listed in the "Supplemental List of Projects" section of the TIP
Kingston	36	Bicycle improvements Roadway resurfacing/ shoulder widening	*On Route 53 throughout Kingston* Restripe the lanes so that, wherever possible or when future roadway reconstruction occurs, a 2.5 m (8 ft)-wide shoulder is added to both sides of the roadway. *(.....page 71)*	MassHighway	At the time of roadway reconstruction
	37	Signage improvements Signal installation/upgrading Speed limit enforcement	*At Silver Birch Lane* Install a flashing beacon; add signage warning drivers of an intersection ahead; enforce the posted speed limit. *(.....page 71)*	State Police Kingston Police MassHighway	As soon as feasible

TABLE 1 (cont.)
Recommended Transportation Improvements
Route 53 Corridor

City, Town	Improvement # (refer to Figure 2)	Improvement Type(s)	Route 53 Location/Description *(For complete description, see Appendix C, page...., Figure....)*	Jurisdiction	Status in Transportation Improvement Program (TIP)/Recommended Sequencing
Kingston (cont.)	38	Crash reduction Curb cut improvements Intersection geometry improvements	*At Tar Kiln Road* Realign Tar Kiln Road so it intersects with Route 53 at a right angle; realign CVS driveway away from Route 53 so it ties into Tar Kiln Road; restripe the lanes so the Route 53 northbound outside lane becomes an exclusive right-turn lane to Tar Kiln Road. *(.....page 73, Figure C-33)*	Town of Kingston MassHighway	As soon as feasible
	39	Congestion reduction Signal installation/upgrading Turning lane/travel lane added	*At Route 3A* Add exclusive left- and right-turn lanes; upgrade the traffic signal. *(.....page 76, Figure C-34)*	MassHighway	Programmed for FY 2006 (Old Colony Planning Council)
Route 53 Corridor/ South Shore	40	Congestion reduction Park-and-ride improvements Public transportation improvements	*Through Braintree, Weymouth, Hingham, Cohasset, Scituate* Restore the Greenbush Line of the Old Colony Railroad to full commuter rail service. *(.....page 81, Figure C-35)*	Local towns MBTA	Project expected to be completed by 2006
	41	Park-and-ride improvements	*Stations on the Kingston/Plymouth commuter rail line* Add parking spaces. *(.....page 81)*	Local towns MBTA	High priority (in the PMT): Kingston, Whitman. Medium: Abington, South Weymouth. Low: Halifax, Hanson.
	42	Park-and-ride improvements	*Stations on the Red Line* Add parking spaces. *(.....page 82)*	Local towns MBTA	High priority (in the PMT): North Quincy, Quincy Adams. Low: Wollaston.
	43	Congestion reduction Public transportation improvements	*Through Weymouth, Hingham, Norwell, Hanover* Extend local bus service from the Red Line to Hanover Mall. *(.....page 82)*	Local towns MBTA	To be done prior to possible Route 3 widening

TABLE 1 (cont.)
Recommended Transportation Improvements
Route 53 Corridor

City, Town	Improvement # (refer to Figure 2)	Improvement Type(s)	Route 53 Location/Description *(For complete description, see Appendix C, page...., Figure....)*	Jurisdiction	Status in Transportation Improvement Program (TIP)/Recommended Sequencing
Route 53 Corridor/ South Shore (cont.)	44	Congestion reduction Public transportation improvements	*Between stations on the Kingston/Plymouth Line and local towns* Add feeder bus service: (a) Hanover via Rockland to Abington Sstation, (b) South Duxbury via Pembroke to Hanson Station, and (c) the Accord Industrial Park in Norwell to Abington Station. *(.....page 83)*	Local towns MBTA	High priority (in the PMT): Hanover to Abington Station and South Duxbury to Hanson Station
	45	Park-and-ride improvements	*At the Hingham Shipyard* Add parking spaces to the commuter boat terminal parking lot. *(.....page 84)*	Town of Hingham MBTA	Medium priority (in the PMT)
	46	Bicycle improvements Congestion reduction Park-and-ride improvements Public transportation improvements	*At the entrance to the former South Weymouth Naval Air Station* Establish a regional, intermodal transportation center at the junction of Route 18, Naval Air Station Road/Trotter Road, and the South Weymouth commuter rail station. *(.....page 84)*	Local towns MBTA MassHighway Lennar Partners	In conjunction with redevelopment at the former South Weymouth Naval Air Station
	47	Congestion reduction Park-and-ride improvements	*In the South Shore area* Encourage expanded use of vanpools and carpools between the South Shore and Boston, as well as increased use of park-and-ride lots near Route 3 exits 10 (Kingston), 12 (Pembroke), and 14 (Rockland). *(.....page 85)*	MassHighway CARAVAN	Ongoing
	48	Pedestrian improvements	*In Hingham, Hanover, Pembroke* Add 9 km (5.6 mi) of new sidewalks along Route 53. *(.....page 85, Figure C-36)*	Local towns MassHighway	At the time of roadway reconstruction
	49	Pedestrian improvements	*In Hanover, Pembroke, Duxbury* Add crosswalks and exclusive pedestrian phasings at three intersections. For more information, see locations #28, 32, and 35 above. *(.....page 86)*	MassHighway	

TABLE 1 (cont.)
Recommended Transportation Improvements
Route 53 Corridor

City, Town	Improvement # (refer to Figure 2)	Improvement Type(s)	Route 53 Location/Description *(For complete description, see Appendix C, page...., Figure....)*	Jurisdiction	Status in Transportation Improvement Program (TIP)/Recommended Sequencing
Route 53 Corridor/ South Shore (cont.)	50	Aesthetic improvements Pedestrian improvements	*At the Braintree/Weymouth line; in Hanover, Rockland, Abington* A pedestrian trail is planned in the Weymouth Landing station area; a pedestrian/bicycle trail is being considered that would traverse Hanover, Rockland, and Abington. *(.....page 86)*	Local towns MBTA MassHighway	Trail near Weymouth Landing is part of mitigation for Greenbush Line restoration
	51	Bicycle improvements	*In the Route 53 corridor* Improved travel conditions for bicyclists would be created by the wider striped shoulders recommended throughout the Route 53 corridor. For more information, see locations #1, 3, 8, 15, 19, 22, 31, 33, and 36 above. *(.....page 89)*	MassHighway	
	52	Bicycle improvements	*In the Route 53 corridor* Add bicycle loop detectors, signs, and markings at eight signalized intersections. For more information, see locations #2, 10, 12, 14, 28, 29, 32, and 35 above. *(.....page 89)*	MassHighway	
	53	Bicycle improvements	*Along the Greenbush Line* PATH, a South Shore citizens group, has recommended a bicycle path within the right-of-way of the restored Greenbush commuter rail line. *(.....page 89, Figure C-37)*	Local towns MBTA	Pursue feasibility with MBTA
	54	Bicycle improvements	*At South Shore commuter rail and Red Line stations* As needed, increase the number of bicycle parking spaces, lockers, and other amenities for bicyclists. *(.....page 89)*	MBTA	As soon as feasible

IMPLEMENTATION PROCESS

Brief outlines of the processes by which proposed highway and public transportation improvements may be implemented are given below. These outlines are intended to help community officials and residents understand the steps which the community needs to follow in order to initiate and further the processes.

Massachusetts Highway Department Projects

MassHighway will assist communities with the implementation of highway projects derived from this plan. Quincy, Braintree, and Weymouth are in MassHighway's District 4; Hingham, Norwell, Hanover, Pembroke, Duxbury, and Kingston are in District 5. The process is as follows:

1. The community must make a written request for assistance to the MassHighway district director. The letter should explain why improvements are needed, describe the proposed improvements, indicate the level of local support for the project, and convey a commitment that the project will be designed by the community and that any right-of-way acquisitions or easements required will be the responsibility of the community. A copy of the letter should be sent to the executive secretary of the Boston MPO as well.

2. The district office will review the request and possibly request a Project Justification Report. It is the responsibility of the community to prepare the report, if requested, and submit it to the district office and the MPO (the information that these reports must contain is indicated in the MassHighway interoffice memorandum provided at the end of this section; see Figure 3).

3. At this point, the town should meet with the district office and MPO to discuss the potential priority of the proposed project and plan the remaining steps required to complete the process, possibly including holding an informational meeting to determine the degree of community support or opposition.

4. If the evaluation of the Project Justification Report is favorable and there is local support for the project, the district office will submit a favorable request to the Project Review Committee (PRC) of MassHighway. The PRC will then determine whether the proposed project is eligible for federal and state highway funding, and MassHighway will notify the community of the results.

5. Once the proposed project is approved, the community should request that the MPO place the project in the region's TIP. The project must carry with it regional benefits and comply with the regional Transportation Plan.

6. Once the project is in the TIP, the community should prepare the necessary construction documents. Depending on the complexity of the project, submittals may be required at the 25%, 75%, or 100% design phase.

7. MassHighway advertises and awards the project, and issues a notice to proceed to start construction.[4]

Projects in the Route 53 corridor can use funds from a variety of funding categories. It should be noted that many other projects compete for the same money; therefore, the priority of the project will determine if it is assigned to a funding category and programmed in the TIP. The funding categories for which Route 53 projects are eligible are:

- National Highway System (NHS) – Funds for projects on all National Highway System roadways.
- Non–Federal Aid (NFA) – Funds for construction, reconstruction, and improvement projects on roads and bridges in urban and rural areas.
- Surface Transportation Program (STP) – Funds for projects chosen by states and localities on any roads that are not functionally classified as local or as rural minor collectors.
- STP Earmark (STP O) – A portion of the STP funding earmarked for projects, chosen by states and localities, that are in urban areas with a population over 200,000 and are for roads that are not functionally classified as local or as rural minor collectors.

Massachusetts Bay Transportation Authority Projects

The MBTA's Service Delivery Policy provides a consistent procedure for the allocation of MBTA transit services within the Authority's service area; it covers both new service and service changes. All service proposals are subject to a review-and-approval process, to ensure that they are consistent with the service guidelines and MBTA Board of Directors initiatives and that they can be implemented within the adopted budget. The process is described below:

1. Proposals for service changes or new service can be made by anyone — private citizens, elected officials, MBTA employees, representatives of neighborhood groups, business organizations, etc. Upon receipt by the MBTA, a proposal will be reviewed by the Manager of Service Planning. If the proposal appears to be consistent with the MBTA's service guidelines and policies, it will be assigned to a service planner for analysis. If it is not consistent, the Planning Department will inform the party making the proposal, in writing, of why the proposal is not being pursued.

[4] The above process assumes that none of the improvements requires an environmental impact assessment.

2. All analysis of service proposals will be done by the Service Planning unit. This analysis will be based on the factors described in the "Evaluation Criteria" section of the Service Delivery Policy. In conducting the analysis, Service Planning will coordinate with other MBTA departments that would be involved in the proposed change, as well as the proponent of the service change. The Service Planning unit will summarize the resources necessary to accommodate the proposal, along with expected impacts on the existing system in terms of frequency, span of service, and geographical coverage.

3. Following the analysis, the service proposal will be reviewed by the Service Planning Committee. The Service Planning unit will recommend to that committee that either (a) the proposal be implemented, (b) a variation of the proposal be implemented, (c) the proposal be deferred, or (d) the proposal be denied. The decision on whether to implement a proposal and the timing of implementation will depend on the significance of the change and whether or not capital expenditures are required. A summary of the analysis and final decision will be forwarded to the party that made the proposal.

4. In general, minor changes that can be made within the adopted budget will be implemented as quickly as possible. Minor changes that would increase costs will be held until they can be "bundled" with other changes that would reduce operating costs by an equal amount. Minor changes are implemented based upon the final recommendation of the Service Planning unit.

5. The implementation of moderate changes will be handled similarly to that of minor changes. If the change does not involve an increase in operating costs, it will be implemented as quickly as possible. Moderate changes that would increase costs will be held until they can be bundled with other changes that would reduce operating costs by an equal amount. Moderate changes must be approved by the Executive Service Oversight Committee.

6. Major changes will be evaluated within the context of a "comparative evaluation" and the development of periodic Service Plans. The comparative evaluation will weigh all of the potential major changes proposed and evaluated since the preceding Service Plan and determine which would define the best allocation of resources. Major changes must be endorsed by the Executive Service Oversight Committee and approved by the General Manager or the MBTA Board of Directors. In most cases, the MBTA Board's approval will occur in the form of approval of a new Service Plan.

The MBTA is currently reviewing this process.

FIGURE 3
MassHighway Project Initiation Form

THE COMMONWEALTH OF MASSACHUSETTS

MASSACHUSETTS HIGHWAY DEPARTMENT

INTEROFFICE MEMORANDUM

TO: Thomas F. Broderick III, P.E., Chief Engineer

FROM: , District _____ Highway Director

DATE:

RE: Request for Project Initiation and Entry into PROJIS/PARS
Project Description:

District ____/Project Development Section requests the above captioned project to be considered by the Project Review Committee. Information pertinent to the project is as follows.

PART I Project Identification and Funding Information

A. City/Town:

B. Route/Street(s):

C. Bridge Number:

D. Is this a state numbered highway? **YES** _____ **NO** _____

E. Is this a state administrated highway? **YES** _____ **NO** _____

F. Location description and estimated project limits by mile marker and station:

G. Number of travel lanes:

H. ADT:

I. Is Proposed Project on the National Highway System? **YES** _____ **NO** _____

J. What is the functional classification of the subject roadway:

____ **Urban Interstate** (U1)
____ **Urban extension of Rural Principal Arterial**(U2)
____ **Urban extension of Rural Minor Arterial** (U3)
____ **Urban other Principal Arterial** (U4)
____ **Urban Minor Arterial** (U5)
____ **Urban Collector** (U6)
____ **Urban Local** (U0)

____ **Rural Interstate** (R1)
____ **Rural Principal Arterial** (R2)
____ **Rural Minor Arterial** (R3)
____ **Rural Major Collector** (R5)
____ **Rural Minor Collector** (R6)
____ **Rural Local** (R0)

K. Project Type:
(Include new project type code)

L. Estimated Construction Duration:
(in months)

M. Estimated Construction Cost:

N. Estimated Advertising Date:

O. Is the proposed project in a Transportation Bond Bill?

YES _____ NO _____ If YES, which Bill: _____

Amount of funds authorized in Bill (If any): _____

P. Anticipated Funding:

Bridge ON System (BRN) _____ **NHS** _____ **IM** _____

Bridge OFF System (BRZ) _____ **STP** _____ **CMQ** _____

NFA _____ **Operating Funds (NFO)** _____

OTHER _____ **Specify:** _____

PART II Description of needs and responsibilities

A. District/Division priority ranking.
Urgent _____ High _____ Routine _____ Low _____

B. Description of need for improvements:

C. District/Division resources. Include design and data gathering.

Design Responsibility:

Boston:

In-house: _____

Consultant: _____

District: _____

City/Town: _____

Other: _____ **Specify:** _____

Boston Project Management Responsibility:

HE _____ **HO** _____ **TRAFFIC** _____ **ENV** _____

Estimated Design Costs

MHD Personnel:

MHD Consultant:

D. Who is responsible for Right of Way:

MHD _____ **Municipality** _____ **County** _____

Other _____ **NA** _____

Adequacy of existing Right of Way:

_____ Probably adequate.

_____ Probably will require takings

_____ Probably will require easements and/or rights of entry

E. What environmental issues may have an impact on the proposed project:

EIS/EIR probably required:	YES _____	NO _____
ENF probably required:	YES _____	NO _____

Cultural Resources:	Major impact _____	Minor impact _____
Hazardous Materials:	Major impact _____	Minor impact _____
Wetlands:	Major impact _____	Minor impact _____
Other: _____	Major impact _____	Minor impact _____

F. Is the project viable based on its projected cost, funding mechanisms available and the timing of the project in relation to others in the area? Is the project to be included in the current federal fiscal year's list of projects to be advertised?

G. Are there any known issues or concerns which could pose a problem in designing and/or implementing this project?

H. Scenic road? **YES** _____ **NO** _____

I. Are bicycle and pedestrian accommodations going to be met?

Pedestrians:	**YES** _____	**NO** _____
Bicycles:	**YES** _____	**NO** _____

If NO, Explain why.

J. Are any design exceptions anticipated: **YES** _____ **NO** _____

K. Is there any other information regarding this project which may be useful to the Project Review Committee in reaching their decision?

PART III **PROJIS History**

Select one: A_____ B1_____ B2_____

A. The District/Division has checked PROJIS for the above project and has not found the project listed.

B. The District/Division has checked PROJIS for the above project and has found the project listed as File Number xxxxxx.

1. The District/Division feels that this entry should be made to this File Number.
2. The District/Division feels that this entry should be made to a new File Number.

Explain:

If you need additional information please do not hesitate to contact _____.
[i]

APPENDIX A

An Inventory of Land Use Developments, Transportation Improvements, and Transportation Concerns in the Route 53 Corridor

INTRODUCTION[1]

Since the general economy flourished during much of the 1990s, it is not surprising that both traffic volumes and demographic indices, such as population and employment, showed growth in the communities in the Route 53 corridor. To better understand the impacts of this growth, the information that follows is an inventory of existing conditions in three affected areas: land use developments, transportation improvements, and local transportation concerns, on or near Route 53.

Figure A-1 highlights this information for the entire corridor. The sections immediately following that figure present information specific to each of the nine communities, from north to south, graphically and in discussion format.

All the information presented in Appendix A is based on meetings and discussions held with town officials; a review of the Boston Metropolitan Planning Organization's (MPO) Transportation Improvement Program (TIP); local news sources on the Internet; environmental impact reports (EIRs); traffic studies; and information from regional planning agencies such as the Metropolitan Area Planning Council (MAPC) and Old Colony Planning Council (OCPC).

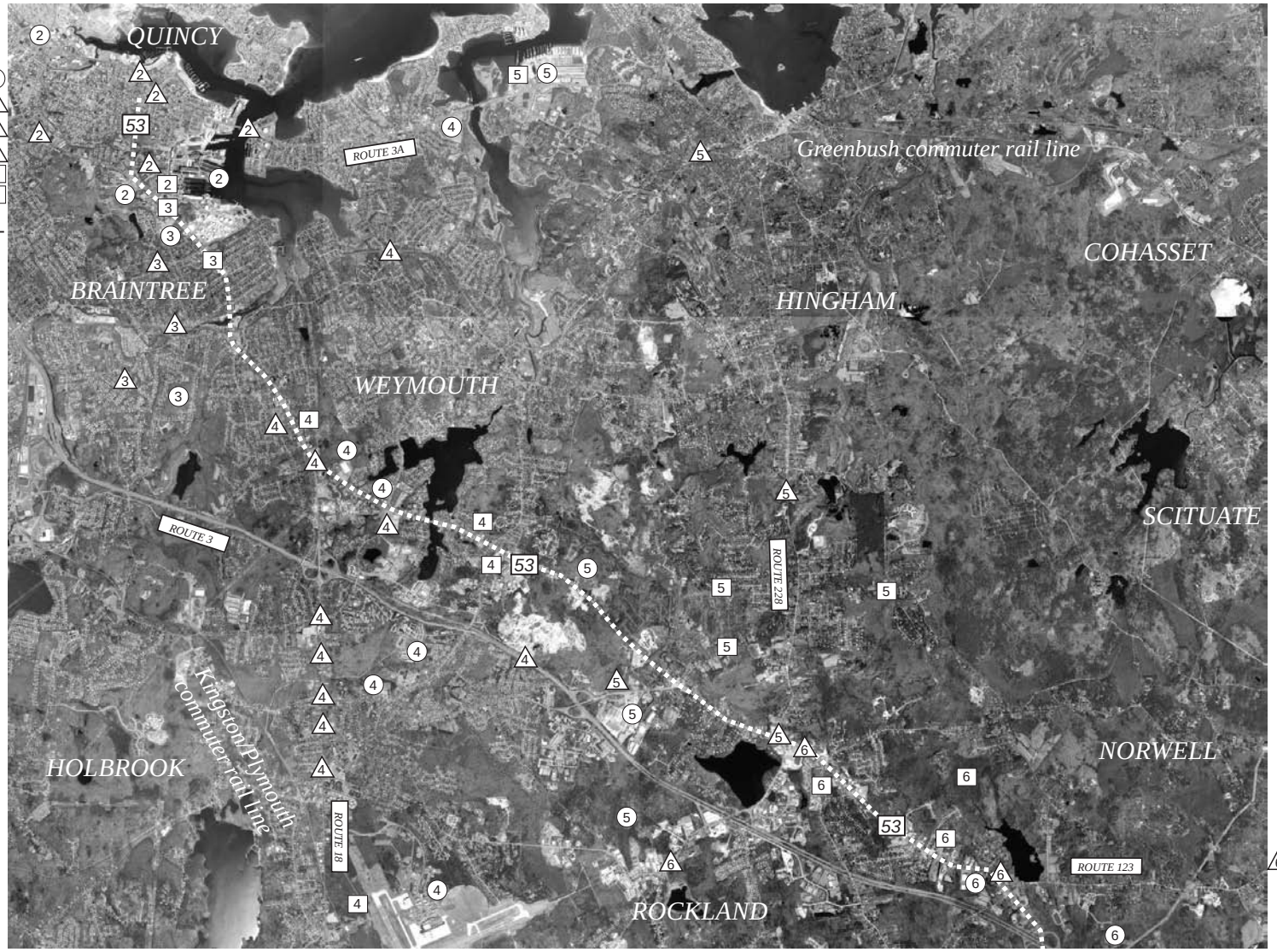
Some basic transportation data are presented, when applicable, throughout this appendix — for instance, traffic counts and the incidence of vehicle crashes. However, the bulk of the Route 53 transportation data (traffic counts; crash data; park and ride facilities; travel time data; and public transportation services, including rail, bus, and ferry) are discussed in more detail in Appendix B.

To ensure consistency, certain terms describing proposed land use developments and transportation improvements in the Route 53 corridor have been defined, in order of "probability to occur," as follows:

- *"Committed to"*: land use developments which are currently being constructed or are imminent, or transportation improvements which are either underway, advertised, or funded in the TIP
- *"Planned"*: land use developments which are scheduled to be built within the next few years, or transportation improvements which are funded or scheduled to occur in the next few years
- *"Considered"*: land use developments which are possible, or transportation improvements which are highly desired and which may be shown in the TIP "Supplemental List of Projects"

These three terms will be used in Figures A-2 through A-10, which summarize existing conditions in the nine communities.

[1] Appendix A is an updated revision of a memorandum distributed to the Route 53 Corridor Transportation Plan Advisory Group, entitled "Task 2: An Inventory of Land Use Developments, Transportation Improvements, and Transportation Concerns in the Route 53 Corridor," March 11, 2002.



(NOTE: Some developments, improvements, and concerns are located outside displayed area)

(NOTE: Improvement is located outside displayed area)

CTPS

Route 53 Corridor Transportation Plan

N

Aerial photo source: MassGIS and MIT

KEY:

- (#) Land Use Developments
- △ # Transportation Improvements
- [#] Transportation Concerns

#	Town
2	Quincy
3	Braintree
4	Weymouth
5	Hingham
6	Norwell

(For details by town, refer to Figures A-2 through A-6)

FIGURE A-1a
Northern Portion of Study Area:
– Land Use Developments
– Transportation Improvements
– Transportation Concerns

(NOTE: Some developments and improvements are located outside displayed area)

CTPS

Route 53 Corridor Transportation Plan

N

Aerial photo source: MassGIS and MIT

KEY:

- (#) Land Use Developments
- △ (#) Transportation Improvements
- [#] Transportation Concerns

(For details by town, refer to Figures A-7 through A-10)

#	Town
7	Hanover
8	Pembroke
9	Duxbury
10	Kingston

FIGURE A-1b
Southern Portion of Study Area:
– Land Use Developments
– Transportation Improvements
– Transportation Concerns

QUINCY (see Figure A-2)

Land Use Developments

There are very limited opportunites for development in the area adjacent to Route 53 in Quincy. One anticipated development is the construction of 196 independent living units in The Falls, the area just south of the signalized Quincy Avenue/Falls Boulevard/Southern Artery intersection. These residential units are expected to be built within five years.

Other developments in Quincy within a few miles of Route 53 are commercial considerations at the Fore River Shipyard, a new high school, and a new Home Depot. There are no current plans to improve the shipyard, but it is expected that future commercial or industrial interests may create employment for up to 1,000 people. Residential development of the shipyard has been ruled out. A section of Faxon Field near Southern Artery at Coddington Street has tentatively been designated as the location for the new Quincy High School. Wetlands and other considerations, such as parking, may impact the time table for its eventual construction. Finally, the Home Depot will be located on Centre Street in southwestern Quincy near the I-93/Route 3 interchange area.

Transportation Improvements

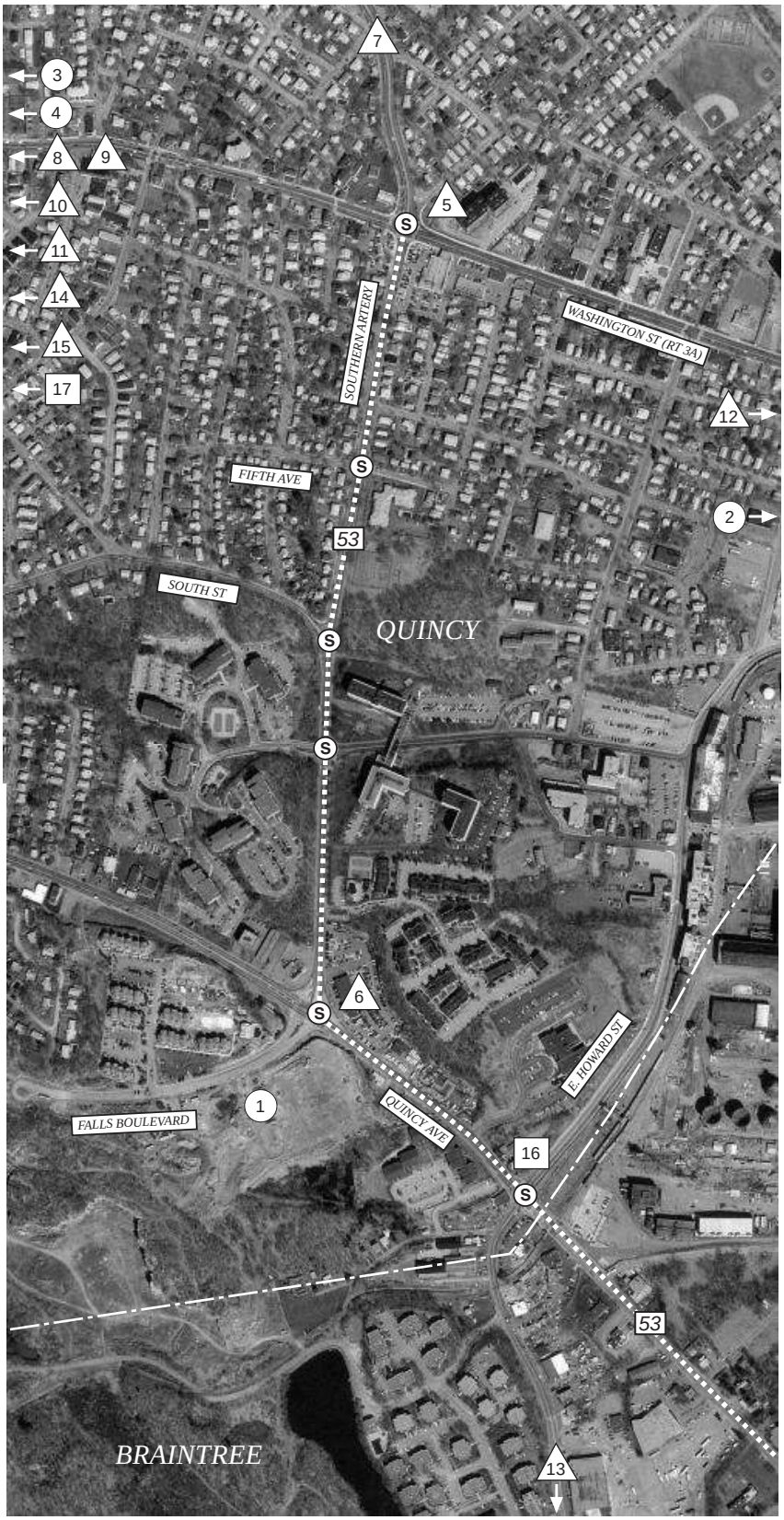
Transportation improvements on or near Route 53 include geometric realignment or widening at the Route 3A (Washington Street) and Falls Boulevard intersections, and a new traffic signal at Southern Artery at Cove Way, approximately 0.25 km (0.15 mi) north of the Route 53/Route 3A intersection.

Other roadway improvements in Quincy that are not in the Route 53 corridor include the Quincy Center Concourse, Phase 1, a city center crosstown connector road (the "West Side Link");[2] Phase 2 of this project, the "East Side Link," listed in Appendix A, "Supplemental List of Projects," of the current TIP; an improvement project involving ramps between the Crown Colony Office Park and I-93/Route 3; a new traffic signal and other improvements at the Southern Artery/Hancock Street intersection (also listed in the TIP, Appendix A); and a temporary replacement of the Fore River Bridge between Quincy and Weymouth, 1.2 km (0.75 mi) east of the Route 53/Route 3A intersection. There have also been recent discussions about eventually building a tunnel under the Fore River rather than constructing a permanent bridge. Current public transportation improvements of a regional and local nature include the restoration of the Greenbush commuter rail line, the planned addition of 111 parking spaces at the North Quincy Red Line station, and the possible addition of 1,300 parking spaces at the Quincy Adams Red Line station.

Transportation Concerns

Traffic levels in the northernmost end of Route 53 are among the highest in the corridor (1999 estimated daily two-way traffic near the Quincy/Braintree line: 27,600). The relatively high number of vehicle crashes which occur in the Quincy section of Route 53 are related to the high traffic volumes there.

[2] Listed in the *Boston MPO Transportation Plan 2000–2025* as a project in the 2025 No-Build scenario.



LAND USE DEVELOPMENTS:

1. The Falls: 196 independent living units to be built within 5 years *(planned)*
2. Quincy Shipyard: no firm plans. Future industrial or commercial development may employ about 1,000 people eventually *(considered)*
3. Quincy High School: new site tentatively located on Coddington St at Southern Artery *(planned)*
4. Home Depot, Centre St *(committed to)*

TRANSPORTATION IMPROVEMENTS:

5. Desired improvements at Rt 53/Rt 3A include adding a southbound through lane *(considered)*
6. Right turn channelization/radius from Quincy Ave WB to the Southern Artery NB needs to be improved. Existing turning speeds are often too high, causing difficulty for pedestrians and vehicles exiting Walgreen's *(considered)*
7. Southern Artery at Cove Way: new traffic signal *(committed to)*
8. Quincy Center Concourse (Phases 1 and 2): this will create a connection between Burgin Parkway and Mechanic St and Revere Rd [TIP ID # 601947] *(committed to/considered)*
9. *(see 8)*
10. New ramps will be built from the Crown Colony Office Park to the Southeast Expressway, Rt 3, and I-93 [TIP ID # 603391] (*planned)*
11. New traffic signal and other improvements at Southern Artery/Hancock St [TIP ID # 602237] *(considered)*
12. Temporary replacement of the Fore River Bridge *(committed to)*
13. Restoration of the Greenbush commuter rail line *(commited to)*
14. Planned addition of 111 new parking spaces at the North Quincy Red Line station *(planned)*
15. Possible addition of 1,300 parking spaces at the Quincy Adams Red Line station *(considered)*

TRANSPORTATION CONCERNS:

16. Numerous collisions and poor operational conditions exist at the Quincy Ave/E. Howard St intersection
17. Crowded conditions on the Red Line, shortage of parking at the four Quincy Red Line stations

CTPS

Route 53 Corridor Transportation Plan

N

Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE A-2
Quincy:
– Land Use Developments
– Transportation Improvements
– Transportation Concerns

There are six signalized intersections on Route 53 in Quincy. Three stand out in terms of total volumes and vehicle collisions: Route 3A (Washington Street), Southern Artery/Falls Boulevard/Quincy Avenue, and East/West Howard Street. Through discussions with Quincy officials, specific concerns and desired remedies at these three intersections and elsewhere on Route 53 involve reducing congestion and improving traffic operations through geometric improvements. At the suggestion of local officials, this plan has reviewed vehicle crash data and traffic operations at Route 53 at East/West Howard Street (Appendix B), and has also developed recommendations for improvement (Appendix C).

With respect to public transportation, general concerns involve the crowded conditions which exist during peak periods on the Red Line's Braintree branch, including difficulties with passengers boarding trains and the shortage of parking at the four Quincy Red Line stations.

BRAINTREE (see Figure A-3)

Land Use Developments

Just as in Quincy, the Route 53 corridor in Braintree is very densely developed, with few opportunities for new large-scale development. In the northern half of the corridor (north of Hayward Street) land use is primarily industrial and commercial, while the southern half is mostly residential.

The one major development that has occurred on Route 53 in Braintree concerns the change in use of the former Quintree Mall at 444 Quincy Avenue. A new motor vehicle dealership owned by Quirk Oldsmobile has been added to the site. Local officials believe this will help in the revitalization of this commercially zoned property.

A second development, which would have 118 residential units, has been proposed for a location off of Liberty Street, approximately 0.8 km (0.5 mi) west of Route 53.

Transportation Improvements

With the exception of the restoration of the Greenbush commuter rail line, there are presently no specific transportation improvement projects planned for Route 53 in Braintree. A project in the vicinity of the Route 53 corridor involves the reconstruction of Union Street from the Route 3 rotary to Commercial Street. This project is listed in Appendix A, "Supplemental List of Projects," of the current TIP. Also, in response to residents' concerns, Braintree officials have initiated a process to see whether a truck ban can be implemented on Hayward Street, west of Route 53.

Transportation Concerns

As described for Quincy, this area of Route 53 (Quincy Avenue at the Quincy/Braintree line) has among the highest daily traffic volumes in the corridor (estimated at nearly 28,000 vehicles per day just north of East Howard Street). Information obtained from the Braintree police suggests that the hilly section of Route 53 between the Quincy line and Hayward Street is particularly problematic with respect to vehicle crashes and near misses. The police data showed

LAND USE DEVELOPMENTS:

1. Change in use of the former Quintree Mall to a new motor vehicle dealership *(committed to)*
2. 118 residential units off Liberty St *(considered)*

TRANSPORTATION IMPROVEMENTS:

3. Reconstruction of Union St from the Rt 3 rotary to Commercial St [TIP ID # 602593] *(considered)*
4. Possible truck ban on Hayward St *(considered)*
5. Restoration of the Greenbush commuter rail line *(committed to)*

TRANSPORTATION CONCERNS:

6. Especially high number of crashes in the #200–299 Quincy Ave blocks
7. Especially high number of crashes in the #400–499 Quincy Ave blocks
8. Improvements needed at the "Braintree Split," the junction of Rt 3 and I-93

CTPS

Route 53 Corridor Transportation Plan

N

Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE A-3
Braintree:
– Land Use Developments
– Transportation Improvements
– Transportation Concerns

that two areas in particular were of concern: the #200–299 and #400–499 Quincy Avenue blocks. This plan has analyzed the crash data in these two sections of Route 53 (Appendix B), and has developed improvement measures based on the crash patterns analyzed (Appendix C).

About 4 km (2.5 mi) to the west of Route 53, a major transportation concern of regional implications involves the upgrading of the "Braintree Split," the junction area of I-93 and Route 3.

With respect to public transportation, Braintree residents are concerned about the forthcoming restoration of the Greenbush commuter rail line. Of specific interest are questions regarding the design of rail crossings and parking facilities, and the project's overall impact on abutting properties.

WEYMOUTH (see Figure A-4)

Land Use Developments

A number of new developments are either under construction or committed to, in or near the Route 53 corridor in Weymouth. Currently underway, or just completed, are a CVS on Route 53 at Route 18 (Main Street), a Lappens Auto Supply Store on Route 53 at Federal Street, a Stop and Shop expansion at the intersection of Route 53 and Middle Street, and 304 residential units (Avalon Ledges Apartment Complex) behind BJ's Wholesale Club, south of Route 18.

Recently completed developments include a Walgreens Drug Store north of Route 53 at the Middle Street intersection and a Lowe's Home Improvement Warehouse at the former Harborlight Mall in North Weymouth. A number of developments have been proposed within 4.8 km (3 mi) of Route 53: 242 to 396 residential units (Alexan at Arbor Hill) on 30 acres off of Pleasant Street near Burkhall Street; a new high school near Pleasant Street and Park Avenue; and a self-sufficient community on the former South Weymouth Naval Air Station. This new community would include residences, businesses, offices, parks, hotels, a conference center, and a golf course, over a 1,450-acre area.

Transportation Improvements

Transportation improvement projects recently completed on or near Route 53 in Weymouth include the reconstruction of Washington Street (Route 53) in the section under local jurisdiction, from Broad Street to Prospect Street. The improvements included resurfacing and striping for one travel lane plus on-street parking, and complete reconstruction of sidewalks on both sides of the roadway. Other recently completed improvements include geometric reconstruction and upraded signals at the Route 18 and Winter Street intersection, the implementation of a truck ban on Front Street between Route 18 and Route 53, and geometric improvements and upgrading of the traffic signals at the Route 53/Route 18 intersection.

Proposed for Route 53, and listed in Appendix A, "Supplemental List of Projects," of the current TIP, are geometric improvements at the Route 53/Middle Street and the adjacent Middle Street/Winter Street intersections. Two proposed projects for an area near Route 53, and programmed for FY 2004 of the TIP, are the purchase of right-of-way for the widening of Route

LAND USE DEVELOPMENTS:

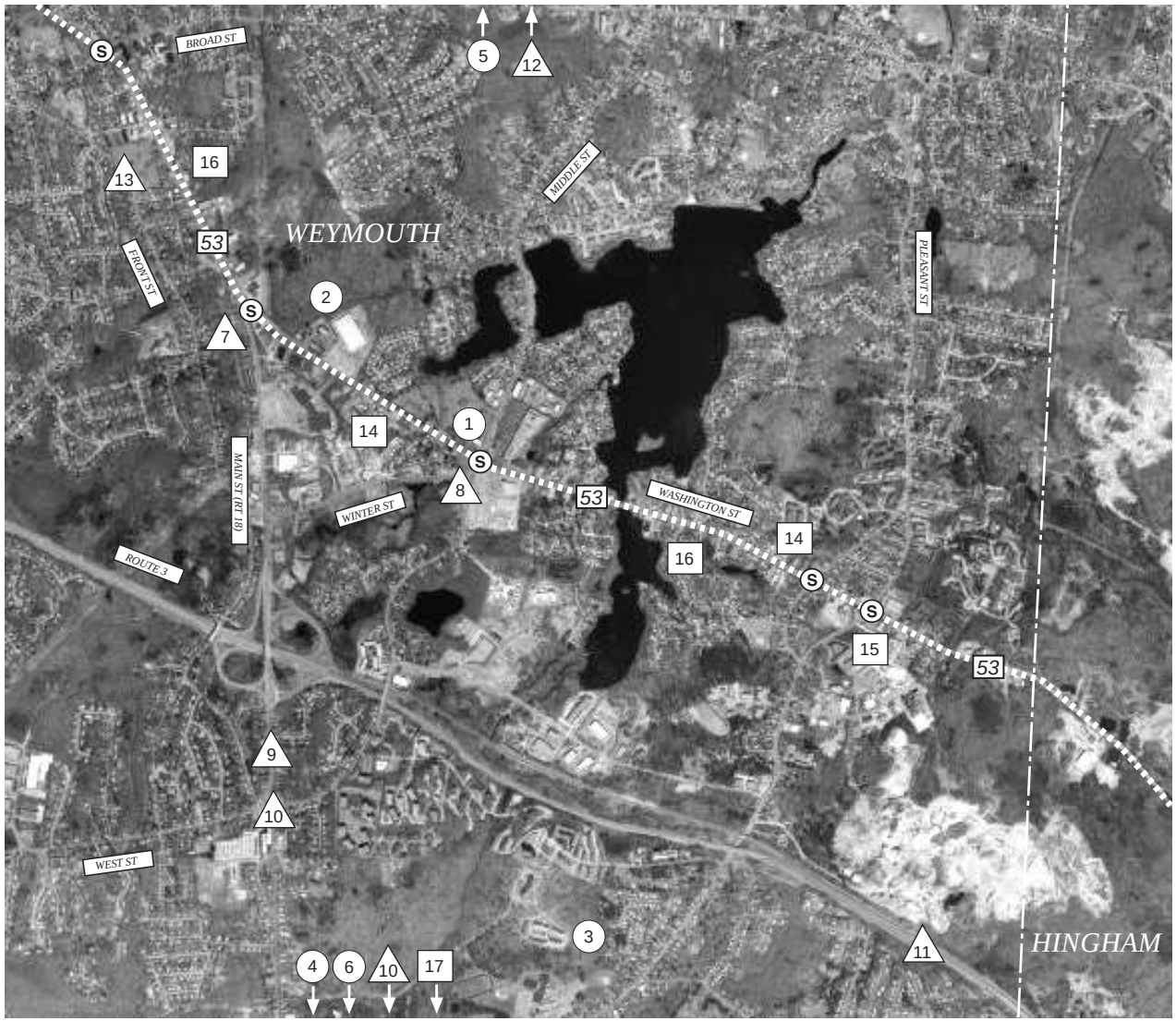
1. Walgreen's Drug Store, Rt 53 at Middle St: completed
2. Avalon Ledges Apartment Complex (304 units), behind BJ's Wholesale Club: completed
3. Alexan at Arbor Hill (242 to 396 apartments) *(considered)*
4. Weymouth High School: new site at Pleasant St and Park Ave *(planned)*
5. Lowe's Home Improvement Warehouse at the former Harborlight Mall in North Weymouth: completed
6. South Weymouth Naval Base redevelopment: a self-sufficient community *(committed to/planned)*

TRANSPORTATION IMPROVEMENTS:

7. Signal upgrade/geometric improvements at Rt 53/Rt 18 [TIP ID # 600181]: completed
8. Geometric improvements at Rt 53/Middle St, and at Middle St/Winter St [TIP ID # 114906] *(planned)*
9. Reconstruction of Rt 18 from Rt 3 to Columbian St [TIP ID # 601630] *(committed to)*
10. Signal improvements on Rt 18 at the West St, Park Ave, and Columbian St intersections [TIP ID # 603161] *(committed to)*
11. Widening of a 24-km (15-mi) section of Rt 3 between Weymouth and Duxbury *(considered)*
12. Restoration of the Greenbush commuter rail line *(committed to)*
13. Truck ban implemented on Front St between Rt 18 and Rt 53: completed

TRANSPORTATION CONCERNS:

14. High frequency of left turns along Rt 53
15. Geometric and operational concerns at Rt 53 at Pleasant St
16. Evaluate potential for bicycle lanes, improved pedestrian facilities along Rt 53
17. Increased parking needed at the South Weymouth commuter rail station; new bus service to the station; proposed creation of a public transportation center at the air base



CTPS

Route 53 Corridor Transportation Plan

N

Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE A-4
Weymouth:
– Land Use Developments
– Transportation Improvements
– Transportation Concerns

18 from Route 3 to Columbian Street, and traffic signal improvements on Route 18 at the West Street, Park Avenue, and Columbian Street intersections.

Possible transportation improvements near Route 53 include the widening of a 24 km (15 mi) section of Route 3 between Weymouth and Duxbury, the construction of a four-lane roadway between the former South Weymouth Naval Air Station and Route 3, the creation of a public transportation center as part of redeveloping the former air station, a possible ban on truck traffic on West Street west of Route 18, and the restoration of the Greenbush commuter rail line across northern Weymouth and Route 53 at Weymouth Landing.

Transportation Concerns

Traffic levels on Route 53 vary considerably from north to south in Weymouth. Just south of the Braintree line, daily two-way traffic volumes are about 33,000, the highest in the entire Route 53 corridor, while at the Hingham line, traffic drops to about 11,000 vehicles per day.

According to local officials, the major transportation concerns in the Route 53 corridor involve the high frequency of left turns into commercial establishments along Route 53; the need for an emergency vehicle priority system (Opticom) on Route 53; the need for upgrading traffic controllers (to 8 DW) at signalized intersections; traffic operations at the Pleasant Street intersection; evaluation of the potential for bicycle lanes, improved pedestrian facilities, street furniture, and streetscaping; and continuation of MBTA bus service further south on Route 53, past the current turn-around at Federal Street, as well as potential new bus service on Route 18 to the commuter rail station at the former South Weymouth Naval Air Station. Finally, there is a need for increased parking at the South Weymouth commuter rail station.

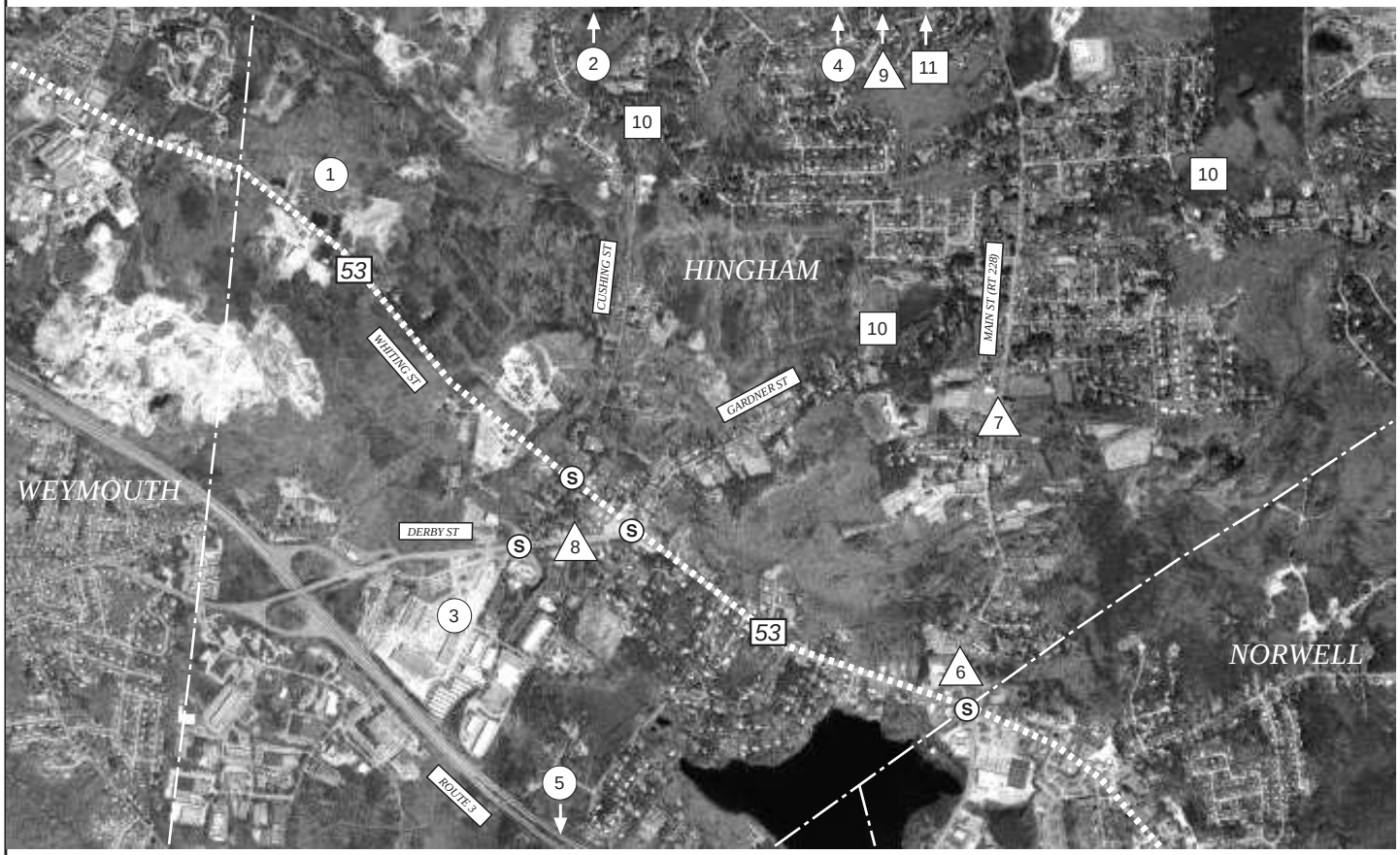
Based on discussions with local officials, it was agreed that CTPS would analyze collision diagrams and traffic operations for Route 53 at Pleasant Street in more detail in this plan (Appendix B), and develop recommendations for improvement (Appendix C).

HINGHAM (see Figure A-5)

Land Use Developments

The northern and southern ends of Route 53 in Hingham vary according to existing land use, and, as a result, in terms of traffic volumes. The northern end, from the Weymouth line to the Gardner Street/Derby Street intersection, is characterized by forested land with pockets of commercial and residential use. Daily two-way traffic volumes near the Weymouth line are just over 11,000 vehicles per day. South of Gardner Street/Derby Street, land use is predominantly residential, with a commercial area near the Norwell line at Routes 53/228 (Queen Anne's Corner). Daily volumes at the southern end of Route 53, north of the Norwell line, are slightly more than 20,000 vehicles per day.

Greater development opportunities, therefore, exist in the northern section of Route 53. Only one significant development is planned for Route 53 in Hingham, the Erickson Retirement Community. Located just south of the Weymouth line, on the northbound side of Route 53, the



LAND USE DEVELOPMENTS:

1. Erickson: 2,266 apartments or 1,300 condominiums for elderly *(committed to)*
2. 118 residential units, golf course (Black Rock) near Cushing St/Ward St: completed
3. Revitalization of Hingham Plaza *(committed to)*
4. Restoration of Hingham Shipyard: condominiums and retail space *(planned)*
5. Serono Inc.: a new headquarters at the Hingham/Rockland line: completed

TRANSPORTATION IMPROVEMENTS:

6. Capacity improvements at Rt 53/Main St (Queen Anne's Corner) [TIP ID # 114880] *(committed to)*
7. Reconstruction of Main St from northern Hingham to Rt 53 *(considered)*
8. Reconstruction/signalization of Derby St from Rt 3 to Rt 53 [TIP ID # 600518] *(considered)*
9. Restoration of the Greenbush commuter rail line *(committed to)*

TRANSPORTATION CONCERNS:

10. Cut-through traffic, including trucks, avoiding the Rt 53/Main St intersection
11. Lack of sufficient commuter boat service and parking availability at the Hingham Shipyard

CTPS

Route 53 Corridor Transportation Plan

N

Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE A-5
Hingham:
– Land Use Developments
– Transportation Improvements
– Transportation Concerns

community will include 2,266 apartment units on more than 100 acres of land off of Old Ward Street.

A number of developments have recently been built or are planned for areas in Hingham that are not along Route 53. One completed development is 118 cluster residential units and an 18-hole golf course, the Black Rock Golf Community, built on 330 acres off of Ward Street near Cushing Street. A revitalization of the Hingham Plaza on Derby Street is planned. This shopping center would increase in size from 300,000 to 400,000 square feet, and would include more high-end retail stores, improvements on Derby Street, and a new traffic signal at the main plaza entrance. A restoration project in the Hingham Shipyard would include 500 condominiums, more than 300,000 square feet of retail space, and an 80-room inn. Finally, a new headquarters for Serono, Inc., was recently built at the Hingham/Rockland line.

Transportation Improvements

The major transportation improvement in or near the Route 53 corridor involves capacity enhancements at the Route 53/Route 228 (Queen Anne's Corner) intersection. This improvement is scheduled for Fiscal Year 2004 in the current TIP.

Other improvements include the reconstruction of Main Street (Route 228) between north Hingham and Queen Anne's Corner, the reconstruction and signalization of Derby Street between Route 3 and Route 53 (both listed in Appendix A, "Supplemental List of Projects," of the current TIP), and the restoration of the Greenbush commuter rail line.

Transportation Concerns

As described above, Route 53 traffic volumes in Hingham are approximately twice as high in the southern section as in the northern. The Massachusetts Registry of Motor Vehicles (Mass. Registry) crash data for 1996–1998 at the three signalized Route 53 intersections reflect this pattern as well: of the 200 crashes registered over the 3.9 km (2.4 mi) length, 45% occurred at the Main Street (southernmost) intersection,[3] 19% at the Gardner Street/Derby Street intersection, and 12% at the Cushing Street (northernmost) intersection. Also, it was determined that the Route 53 at Gardner Street/Derby Street intersection would receive additional scrutiny in this plan in terms of vehicle crash patterns and traffic operations (Appendix B), and that recommended improvements would be developed for this location (Appendix C).

Specific transportation concerns, other than congestion in the southern end of Route 53, are: cut-through traffic, including trucks, to Route 53 through residential neighborhoods, avoiding AM and PM peak period queues at the Main Street intersection with Route 53; and, the lack of sufficient commuter boat service and parking availablity at the Hingham Shipyard.

[3] Since the Hingham/Norwell line cuts through Queen Anne's Corner, the Norwell crash data have been included in this total (48 crashes attributed to Hingham, 45 to Norwell over the three-year period).

NORWELL (see Fig. A-6)

Land Use Developments

One major development was recently completed in the Route 53 corridor in Norwell: a 60,000 square feet Stop and Shop supermarket, built in 2002 and located on a 16-acre parcel near the Norwell/Hanover line. The major access point is on Route 53 across from Jacob's Trail, while a minor access road connects to Route 123 (Webster Street) in Hanover.

The only other development expected to occur involves a residential complex (Silver Brook Farm) about 0.8 km (0.5 mi) east of Route 53. In this complex, 30 single-family homes are scheduled to be constructed during on 28 acres on South Street near Route 3.

Transportation Improvements

Major transportation improvements have recently been completed or have been committed to on both ends of Route 53 in Norwell. Capacity improvements are planned for Queen Anne's Corner, at the northern end of Route 53. These improvements are scheduled for Fiscal Year 2004 in the current TIP. In addition to the improvements at the intersection itself, construction of a two-way center left-turn lane is scheduled for Route 53 between Queen Anne's Corner and Grove Street/High Street in Norwell. There will also be capacity improvements at the Route 53/Grove Street/High Street intersection.

At the southern end, improvements to Route 53 occurred in 2002 as part of the Stop and Shop project. Included were a new signal at the Stop and Shop driveway/Jacob's Trail, with pedestrian phasing, new sidewalks, and widening of Route 53 from the new signal southward to the Route 123 intersection (Assinippi), just over the Hanover line.

Improvements occurring in areas that are not on Route 53 include the reconstruction of Route 123 from west of Dover Street to the Scituate line, and the widening of Hingham Street in Rockland near the Norwell line, about 2.4 km (1.5 mi) west of Queen Anne's Corner (both listed in Appendix A, "Supplemental List of Projects," of the TIP).

Transportation Concerns

As was mentioned above for Hingham, the Queen Anne's Corner intersection (Route 53 at Route 228) encounters the highest number of crashes in either Hingham or Norwell on Route 53, based on Mass. Registry data.[4] However, since major improvements are scheduled to occur during 2004 between Queen Anne's Corner and Grove Street/High Street, no vehicle crash diagrams were constructed for Route 53 intersections in Norwell in this plan.

Specific concerns mentioned by local officials included: a need for service roads behind businesses in order to minimize or reduce the number of curb cuts while retaining access; the prevalence of trucks on Route 53 and the adjacent streets; and the need for more east-west connections between the Route 53 and Route 3A corridors so as to relieve Route 123 of high congestion levels.

[4] At this location, Route 53 intersects with Main Street (Route 228) in Hingham and with Pond Street in Norwell.

LAND USE DEVELOPMENTS:

1. A 60,000-square-foot Stop & Shop: completed
2. A residential complex on South St: 30 single-family homes *(committed to)*

TRANSPORTATION IMPROVEMENTS:

3. Capacity improvements at Rt 53/ Rt 228 (Queen Anne's Corner) [TIP ID # 114880] *(committed to)*
4. A two-way left-turn lane between Queen Anne's Corner and Grove St/ High St, including capacity improvements at Grove St/High St *(committed to)*
5. Roadway improvements between Jacob's Trail and Rt 123 (new signal, widening, sidewalks): completed
6. Reconstruction of Rt 123 from west of Dover St to the Scituate line [TIP ID # 602378] *(considered)*
7. Widening of Hingham St in Rockland, 2.4 km (1.5 mi) west of Queen Anne's Corner *(planned)*

TRANSPORTATION CONCERNS:

8. Service roads are needed behind businesses so that Rt 53 curb cuts can be reduced
9. Trucks are too numerous on Rt 53 and on adjacent streets
10. Additional east-west connections are needed between Rt 53 and Rt 3A (Rt 123 is too congested)

CTPS

Route 53 Corridor Transportation Plan

N

Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE A-6
Norwell:
– Land Use Developments
– Transportation Improvements
– Transportation Concerns

HANOVER (see Figure A-7)

Land Use Developments

No major developments are scheduled to occur along Route 53 in Hanover. However, three residential developments for the elderly and an upgrade of a YMCA have been proposed or recently completed near Route 53.

A 42-unit residential complex for the elderly, The Elms, has been proposed for 35 acres off of Main Street, north of Route 123 (Webster Street). A 41-unit senior housing project has been proposed between Hanover Street and Plain Street. The third complex will have 66 units of senior housing and will be located off of Washington Street across from Shaw's supermarket. The final development on or near Route 53 involves a completed expansion of the Mill Pond YMCA off of Mill Street.

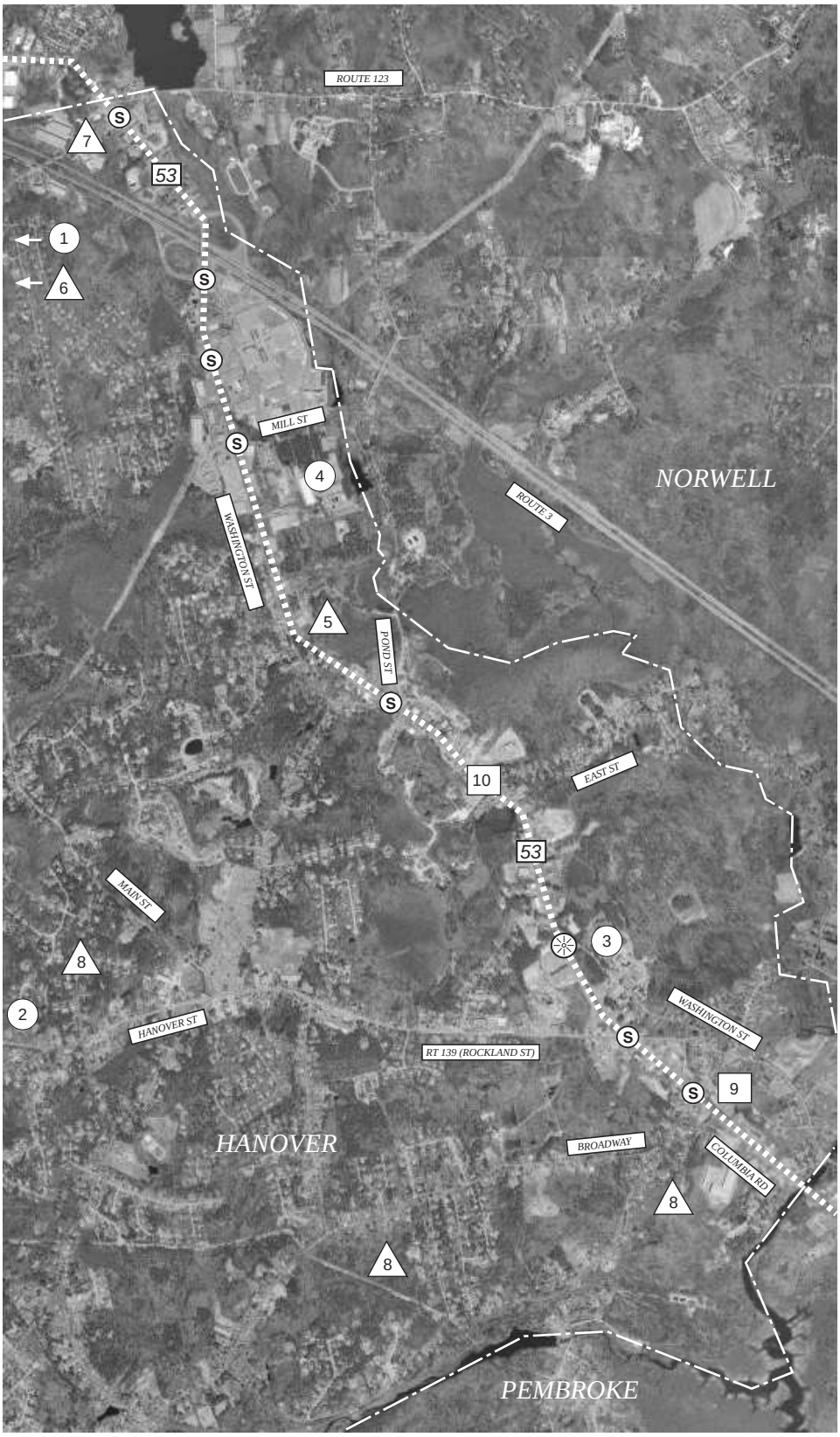
Transportation Improvements

Two major transportation improvements are scheduled on or near Route 53 in Hanover. The current two-lane, 1.45 km (0.9 mi) section just south of Mill Street to Pond Street will be widened to include two travel lanes in each direction and a two-way center left-turn lane. This will yield a five-lane cross-section, continuing the five-lane section which begins just south of the Route 3 southbound ramps near the Hanover Mall. The project, referred to as Route 53, Phase 1B, is listed in Appendix A, "Supplemental List of Projects," of the current TIP. Another transportation improvement project listed for FY 2006 of the TIP includes widening and reconstruction of Route 123 from the Rockland line to the Norwell line.

Potential pedestrian/bicycle improvements near the Route 53 corridor include a pedestrian/bicycle trail along the former Hanover Branch of the Old Colony Railroad. This could eventually be part of a larger "Walk to the Sea" trail network, stretching from Abington and Rockland through Hanover to Pembroke and Marshfield, and/or to Norwell and Scituate.

Transportation Concerns

Traffic volumes in the Hanover section of the Route 53 corridor range from 25,000 vehicles per day near Pond Street, to 30,000 vehicles per day by Mill Street near the Hanover Mall. There are eight signalized intersections on Route 53 in Hanover. Of these, one intersection, Route 53 at the Shaw's driveway in southeastern Hanover, has a flashing beacon with one signal face in each of the four directions. Two intersections were recommended by local officials to be in need of further study: Route 53 at Broadway (signalized), and Route 53 at East Street (unsignalized). These are discussed and analyzed further in Appendices B and C, respectively.



LAND USE DEVELOPMENTS:

1. The Elms: a 42-unit elderly housing complex near Main St and Rt 123 *(planned)*
2. A 41-unit elderly housing complex between Hanover St and Plain St *(planned)*
3. A 66-unit elderly housing complex on Washington St across from Shaw's supermarket *(committed to)*
4. An expansion of the Mill Pond YMCA on Mill St: completed

TRANSPORTATION IMPROVEMENTS:

5. Widening of Rt 53 (Phase 1B) from south of Mill St to Pond St [TIP ID # 114501] *(considered)*
6. Widening and reconstruction of Rt 123 from the Rockland line to the Norwell line [TIP ID # 600404] *(considered)*
7. Upgrading of traffic signals at Rt 53/Rt 123 [TIP ID # 602602]: completed
8. Potential pedestrian/bicycle trail along the former Hanover branch of the Old Colony Railroad *(considered)*

TRANSPORTATION CONCERNS:

9. Crashes and traffic operations at Rt 53 at Broadway
10. Traffic operations at Rt 53 at East St

CTPS

Route 53 Corridor Transportation Plan

N

Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE A-7
Hanover:
– Land Use Developments
– Transportation Improvements
– Transportation Concerns

PEMBROKE (see Figure A-8)

Land Use Developments

There are no current plans for large-scale development along the 6.6 km (4.1 mi) of Route 53 in Pembroke. Just over 3 km (2 mi) northeast of Route 53, however, a few developments have been either completed or proposed. The developments, all located in the vicinty of the interchange of Route 3 and Route 139, near the North River Plaza, include: Lowe's Home Improvement Center, a 135,000-square-foot retail building and 29,000-square-foot garden center on 20 acres; a recently completed Kohl's Department Store in the North River Plaza; and, a 150,000-square-foot retail store and garden shop at Corporate Park off of Oak Street, possibly a Home Depot.

Transportation Improvements

There are no significant transportation improvements underway or proposed for Route 53 in Pembroke. One improvement, however, was recently completed on Water Street, which intersects Route 53 in northern Pembroke. Sidewalks were constructed on a 1.6 km (1 mi) section on the south side of Water Street, between Route 53 and Route 139.

Transportation Concerns

After Weymouth, Pembroke has the highest contrast in traffic volumes, north to south, of the communities along Route 53. In the north, at the Hanover line, daily two-way traffic volumes on Route 53 are about 26,700 vehicles per day, while in the south, at the Duxbury line, daily volumes are about 6,000.

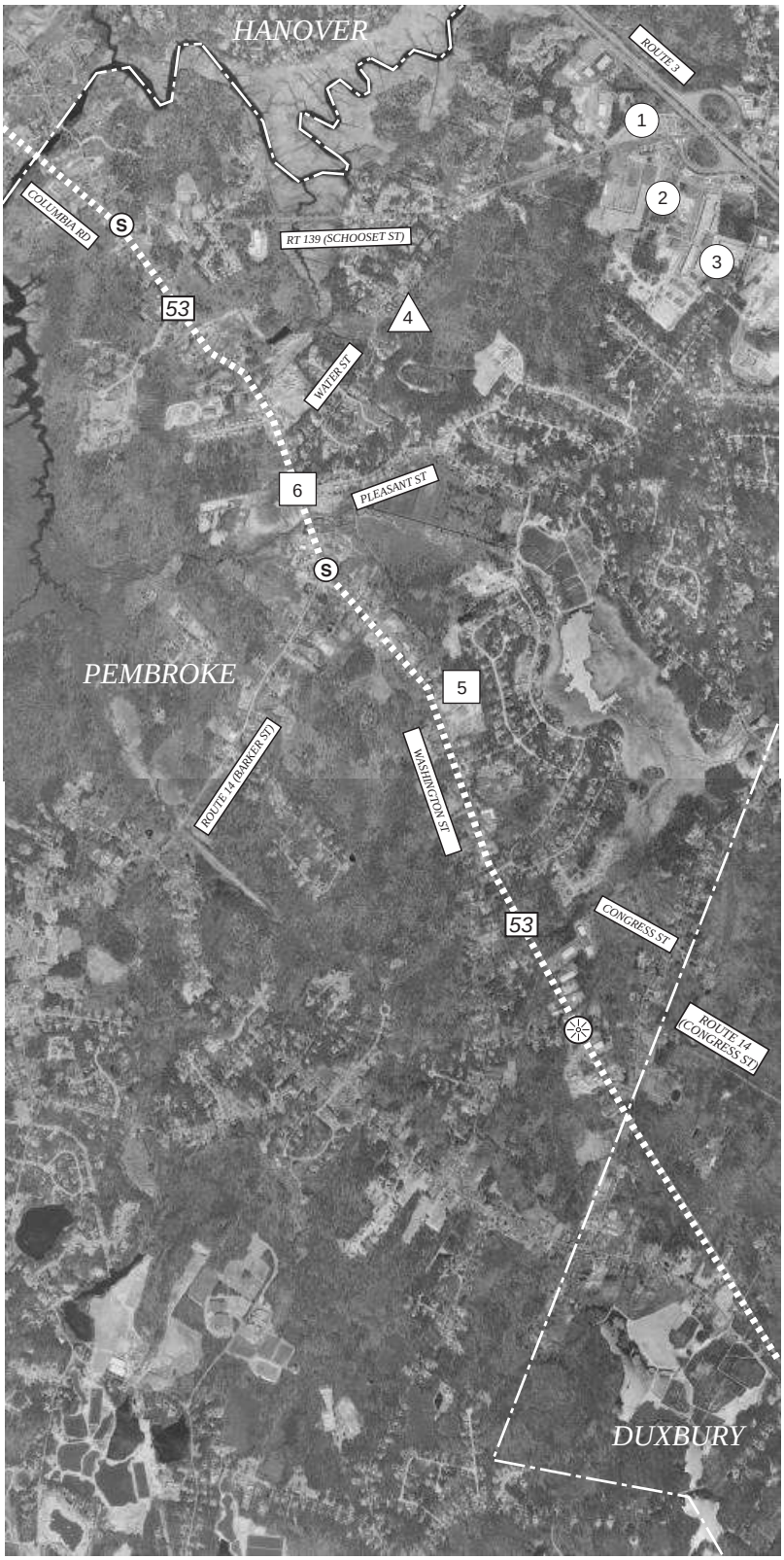
One area of local concern involves the lack of sidewalks along Route 53 in Pembroke. This concern was also prominent in local news reports. Currently, sidewalks are limited to the northern, more built-up section between Water Street and Schooset Street, and the section near the newly signalized and improved intersection at Route 14 (Barker Street).

A second area of concern pertains to vehicle crashes at unsignalized intersections. One particular intersection was recommended for additional study: Route 53 at Pleasant Street. It was studied in detail and is discussed in Appendices B and C, respectively. Three Route 53 intersections in Pembroke are currently signalized, one of which has a flashing beacon: Route 53 at Congress Street (Route 14).

DUXBURY (see Figure A-9)

Land Use Developments

Three residential developments have been proposed for the near future in Duxbury, one in the Route 53 corridor and the other two in northeastern Duxbury. Thirty assisted living units are currently being constructed next to the Welch Health Care and Retirement complex, near the intersection of Kingstown Way and Elm Street. The Delano's Farm condominium complex is a 20-unit development proposed for a 10-acre site off of Cordwood Path, near Jeremiah Drive. One



LAND USE DEVELOPMENTS:

1. Lowe's Home Improvement Center: a 135,000-square-foot retail building and a 29,000-square-foot garden center on 20 acres *(committed to)*
2. Kohl's Department Store, renovating a closed Caldor's in North River Plaza: completed
3. A 150,000-square-foot retail store and garden shop, Corporate Park off Oak St (possibly Home Depot) *(planned)*

TRANSPORTATION IMPROVEMENTS:

△4 New sidewalk on Water St, a 1.6-km (1-mile) section between Rt 53 and Rt 139: completed

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TRANSPORTATION CONCERNS:

5 Local concern: lack of sidewalks in the Rt 53 corridor

6 Problematic intersection: Rt 53 at Pleasant St

CTPS

Route 53 Corridor Transportation Plan

N

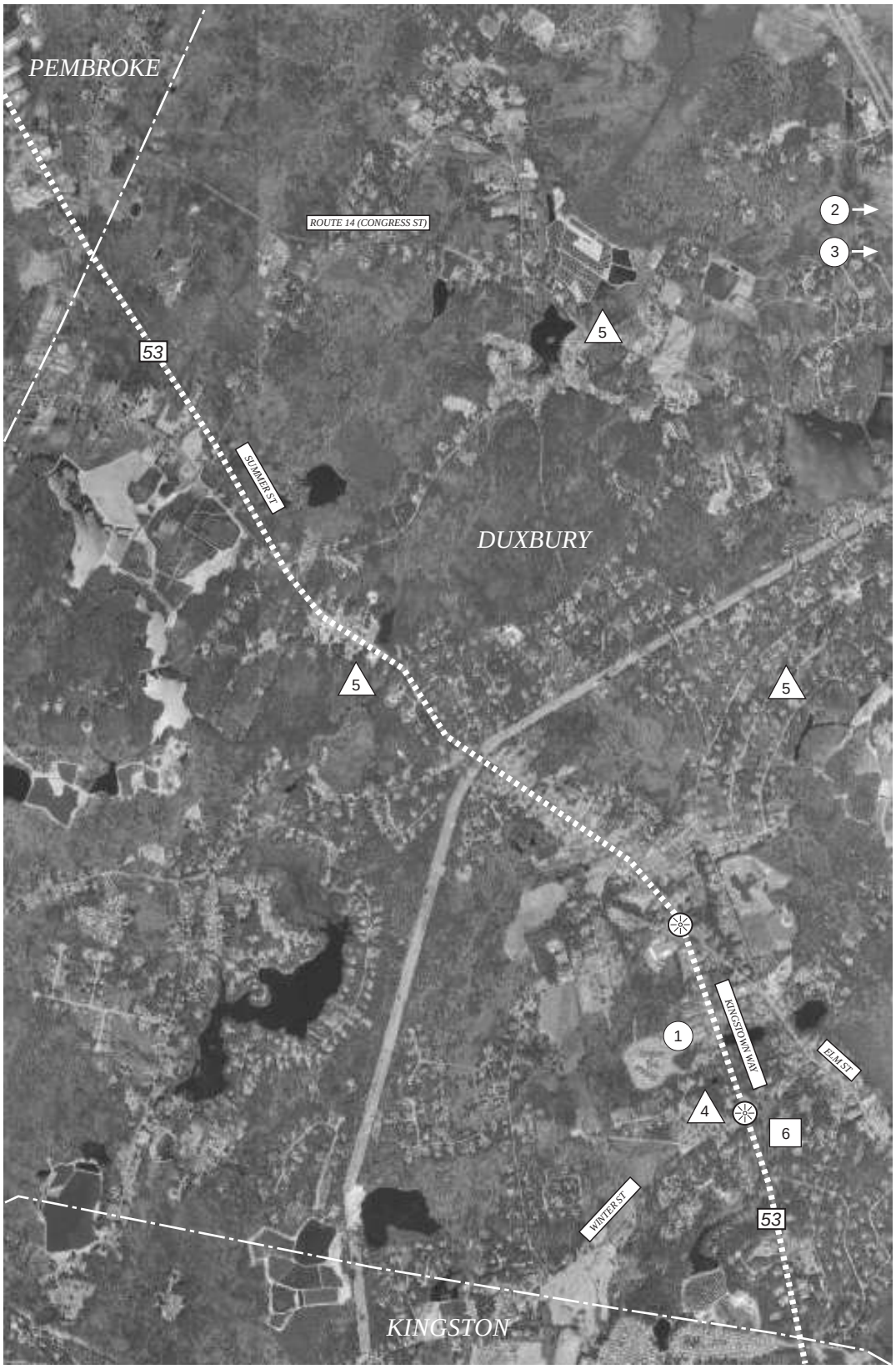
Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE A-8
Pembroke:
– Land Use Developments
– Transportation Improvements
– Transportation Concerns



LAND USE DEVELOPMENTS:

1. 30 assisted living units next to the Welch Health Care complex *(committed to)*
2. Delano's Farm condominium complex, 20 units off Cordwood Path *(considered)*
3. 108 residential units off Rt 139, on the Marshfield/ Duxbury line *(considered)*

TRANSPORTATION IMPROVEMENTS:

4. Improvements at the Rt 53/Winter St intersection [TIP ID #603462] *(considered)*
5. Local per year spending of $100,000 to build 1 mile of sidewalks *(considered)*

TRANSPORTATION CONCERNS:

6. Improve traffic operations at the Rt 53 and Winter St intersection

CTPS

Route 53 Corridor Transportation Plan

N

Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE A-9
Duxbury:
– Land Use Developments
– Transportation Improvements
– Transportation Concerns

hundred and eight affordable housing units are proposed to be built on 43 acres off of Route 139 on the Duxbury/Marshfield border.

Transportation Improvements

One project is listed in Appendix A, "Supplemental List of Projects," of the current TIP: to improve the intersection of Route 53 and Winter Street.

Based on local concerns regarding the lack of sidewalks in the community, it was suggested by the local sidewalk committee that the town spend about $100,000 per year to build 1.6 km (1 mi) of sidewalks along town streets. The construction of sidewalks along Route 53 was also supported by the committee.

Transportation Concerns

The primary local transportation concerns included traffic operations at the intersection of Route 53 and Winter Street. It was recommended by the planning department, as well as by a representative of the Duxbury police department, that this intersection receive more in-depth study, including analysis of crash data. This analysis is shown in Appendices B and C, respectively.

A second location that was analyzed is the intersection of High Street where it intersects Route 53 at an acute angle, creating diminished sight lines and potential difficulties for vehicles exiting onto the highway. The analysis of this intersection is discussed in Appendix C.

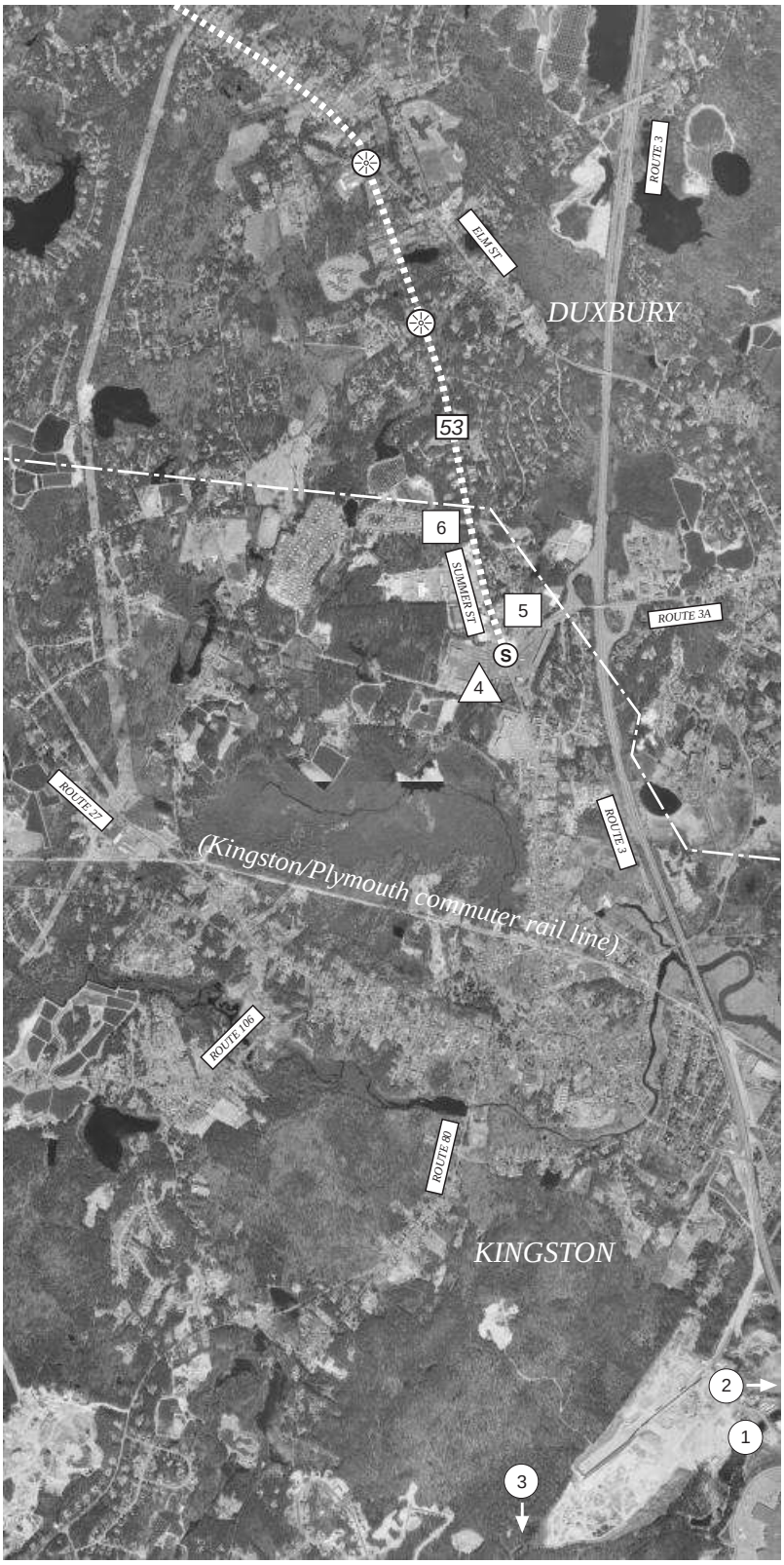
KINGSTON (see Figure A-10)

Land Use Developments

Currently, there are no major development plans in Kingston along Route 53. Three developments of note have either recently been completed or are scheduled to occur a few miles away, however. A 160,000-square-foot Lowe's Home Improvement Warehouse has been completed near the Independence Mall, approximately 3 km (2 mi) south of the Route 53/Route 3A intersection. Target, a 126,000-square-foot retail store, has also been completed at the Independence Mall. Further to the south, in northern Plymouth, the Pinehills LLC developers have proposed a 700,000-square-foot retail development near Camelot Industrial Park off of Long Pond Road.

Transportation Improvements

Improvements have been proposed for the intersection of Route 53 and Route 3A. The final design alternative is pending. This project is listed in the Old Colony Planning Council TIP for fiscal year 2006.



LAND USE DEVELOPMENTS:

1. Lowe's Home Improvement Center: 160,000-square-foot retail building on 30 acres near Independence Mall: completed
2. Target, a new 126,000-square-foot retail store at Independence Mall: completed
3. A 700,000-square-foot retail development by Pinehills LLC near Camelot Industrial Park (in northern Plymouth) *(considered)*

TRANSPORTATION IMPROVEMENTS:

4. Proposed improvements at the Rt 53 and Rt 3A intersection [OCPC MPO TIP ID #600865] *(considered)*

TRANSPORTATION CONCERNS:

5. Problematic traffic operations at the CVS driveway/ Tar Kiln Rd intersection with Rt 53
6. Problematic traffic operations at the Silver Birch Lane/Rt 53 intersection

CTPS

Route 53 Corridor Transportation Plan

N

Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE A-10
Kingston:
– Land Use Developments
– Transportation Improvements
– Transportation Concerns

Transportation Concerns

Two-way traffic volumes just north of the Route 53/Route 3A intersection are about 11,000 vehicles per day. Local transportation concerns on Route 53 pertain to traffic operations at driveways and side streets. Of particular concern are vehicle movements at the intersection of Route 53 with the CVS driveway/Tar Kiln Road, as well as at the Silver Birch Lane intersection. This plan analyzed crash data and/or traffic operations at those two intersections, as requested by local officials, and developed recommendations for improvements (Appendix C).

APPENDIX B

Transportation-Related Data Pertaining to the Route 53 Corridor

INTRODUCTION[1]

Appendix B describes the transportation characteristics for existing travel modes within the Route 53 corridor and the South Shore area. Included are data and information pertaining to motor vehicles, public transportation, pedestrians, and bicycles. The categories of data and information presented include:

- Traffic counts, vehicle crash data, intersection level-of-service (LOS) analysis, park-and-ride facilities, travel-time runs, ride sharing (motor vehicles)
- Extent of service, ridership data (rail, bus, and commuter boat services)
- Sidewalks, dedicated paths (pedestrians and bicycles)

MOTOR VEHICLES

Traffic Counts

Traffic counts were obtained from numerous sources, including existing traffic studies, environmental impact reports (EIRs), the Massachusetts Highway Department (MassHighway), Old Colony Planning Council (OCPC), local traffic count programs, and Central Transportation Planning Staff (CTPS). Most of the counts were collected from 1999 through 2001, and for the purposes of this plan, the base year for the existing counts is identified as 2000.

Figures B-1, B-2, and B-3 show daily traffic volumes for 17 locations on Route 53, north to south, respectively. These range from 33,000 vehicles per day at the Braintree/Weymouth line to 6,000 vehicles per day at the Pembroke/Duxbury line. Also shown, for comparative purposes, are daily volumes at 26 locations on roadways in the vicinity of the Route 53 corridor (on Routes 3, 3A, 14, 18, 37, 123, 139, 228, and on certain local roads). Manual Turning Movement Counts (MTMCs) for 30 key signalized and unsignalized intersections in the Route 53 corridor are summarized in Appendix C-1.

Tables B-1 through B-9 describe all of the Route 53 traffic count data for the nine abutting communities.

Crash Data

Vehicle crash data were gathered from local police departments for this plan. Actual police accident reports were analyzed for intersections identified by local officials as being in need of further study. Police reports for the most recent three-year period were obtained, usually for 1998 through 2000.

These data enabled CTPS to construct collision diagrams of the intersections identified by local officials. The diagrams helped to identify probable causes for crashes occurring at the intersections, and contributed to the development of recommended transportation improvements (refer to Appendix C).

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[1] Appendix B is an updated revision of a memorandum distributed to the Route 53 Corridor Transportation Plan Advisory Group, entitled "Task 3: Route 53 Corridor Transportation-Related Data," September 27, 2002.

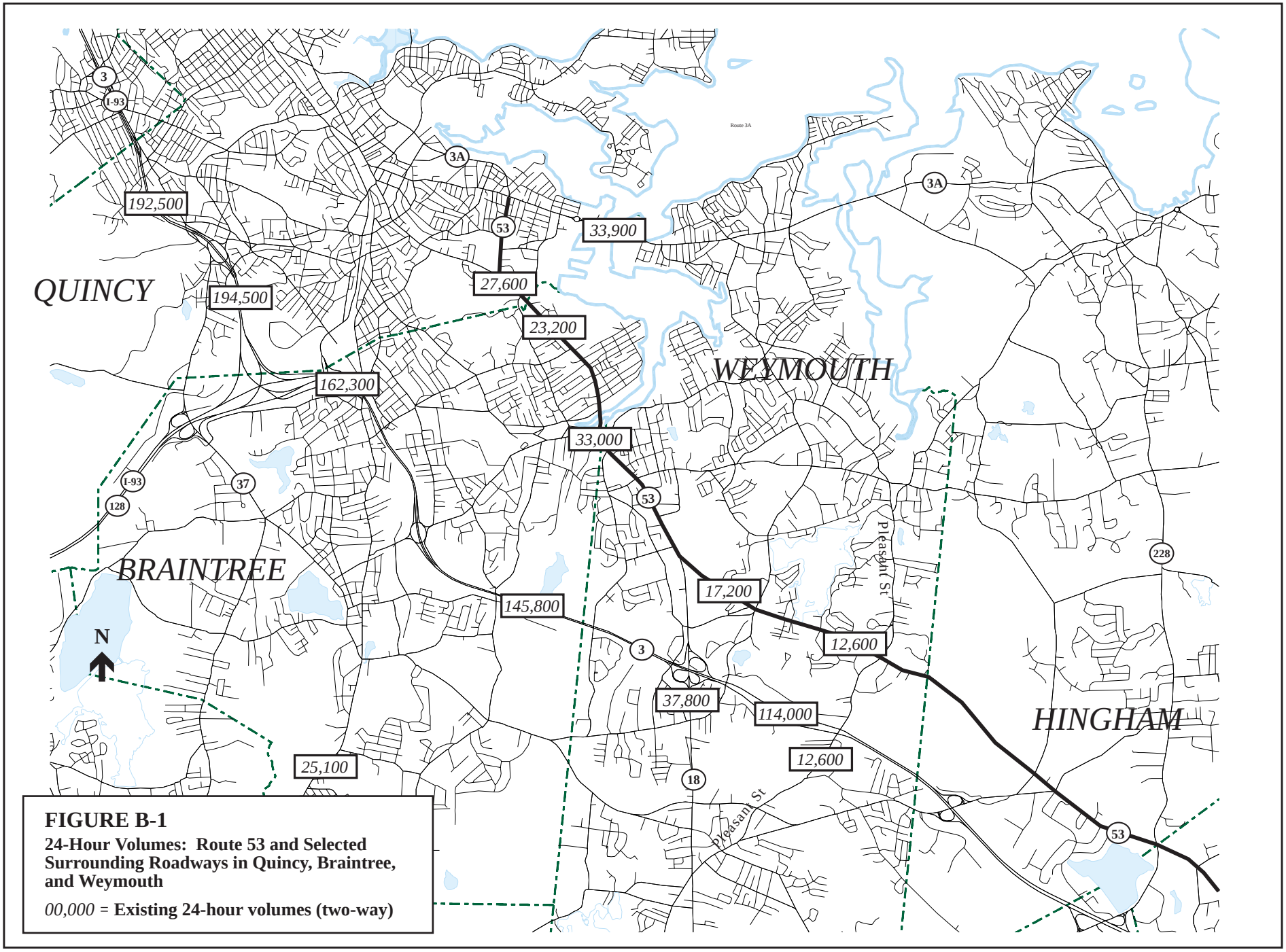


FIGURE B-1

24-Hour Volumes: Route 53 and Selected Surrounding Roadways in Quincy, Braintree, and Weymouth

00,000 = **Existing 24-hour volumes (two-way)**

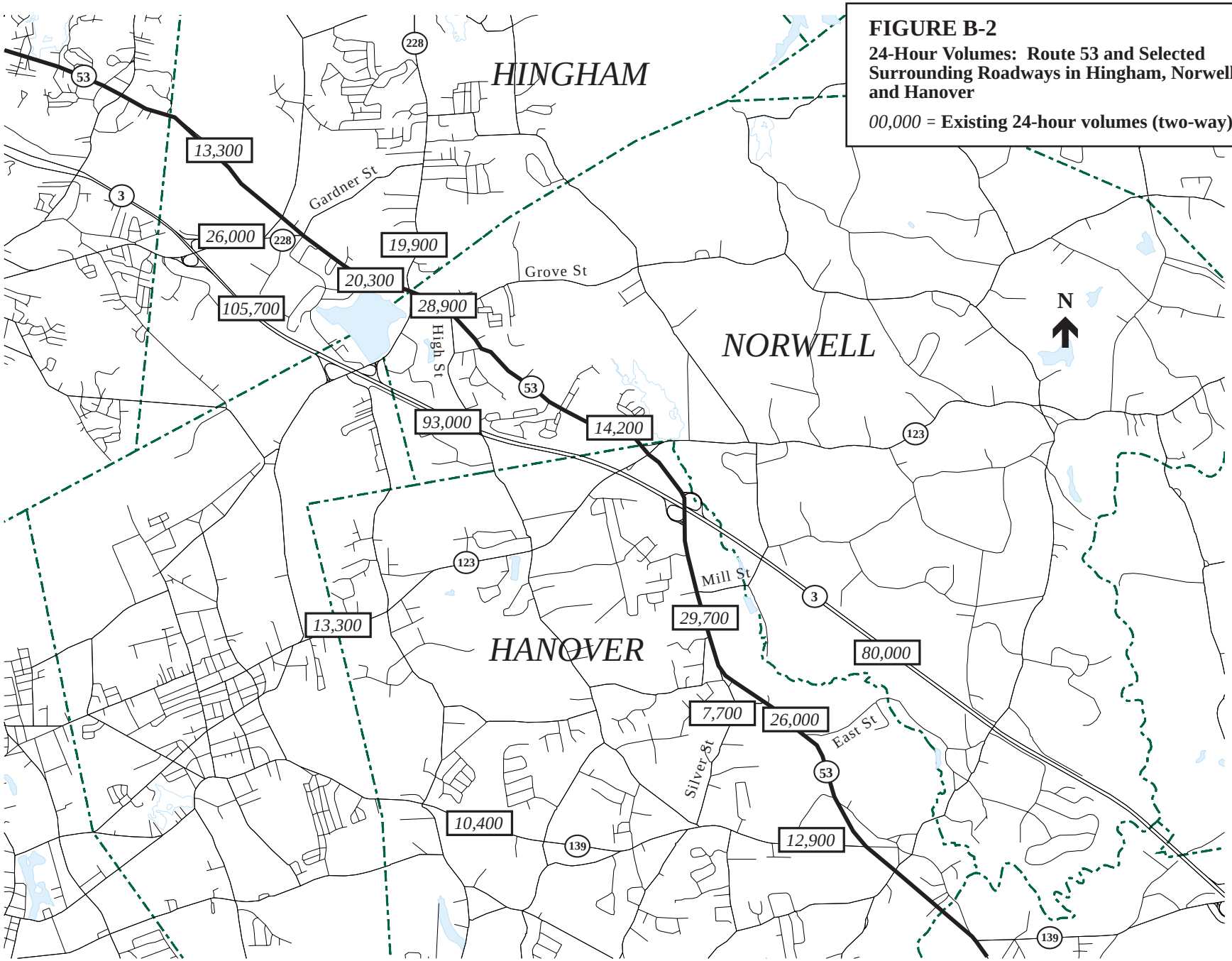


FIGURE B-2

24-Hour Volumes: Route 53 and Selected Surrounding Roadways in Hingham, Norwell, and Hanover

00,000 = **Existing 24-hour volumes (two-way)**

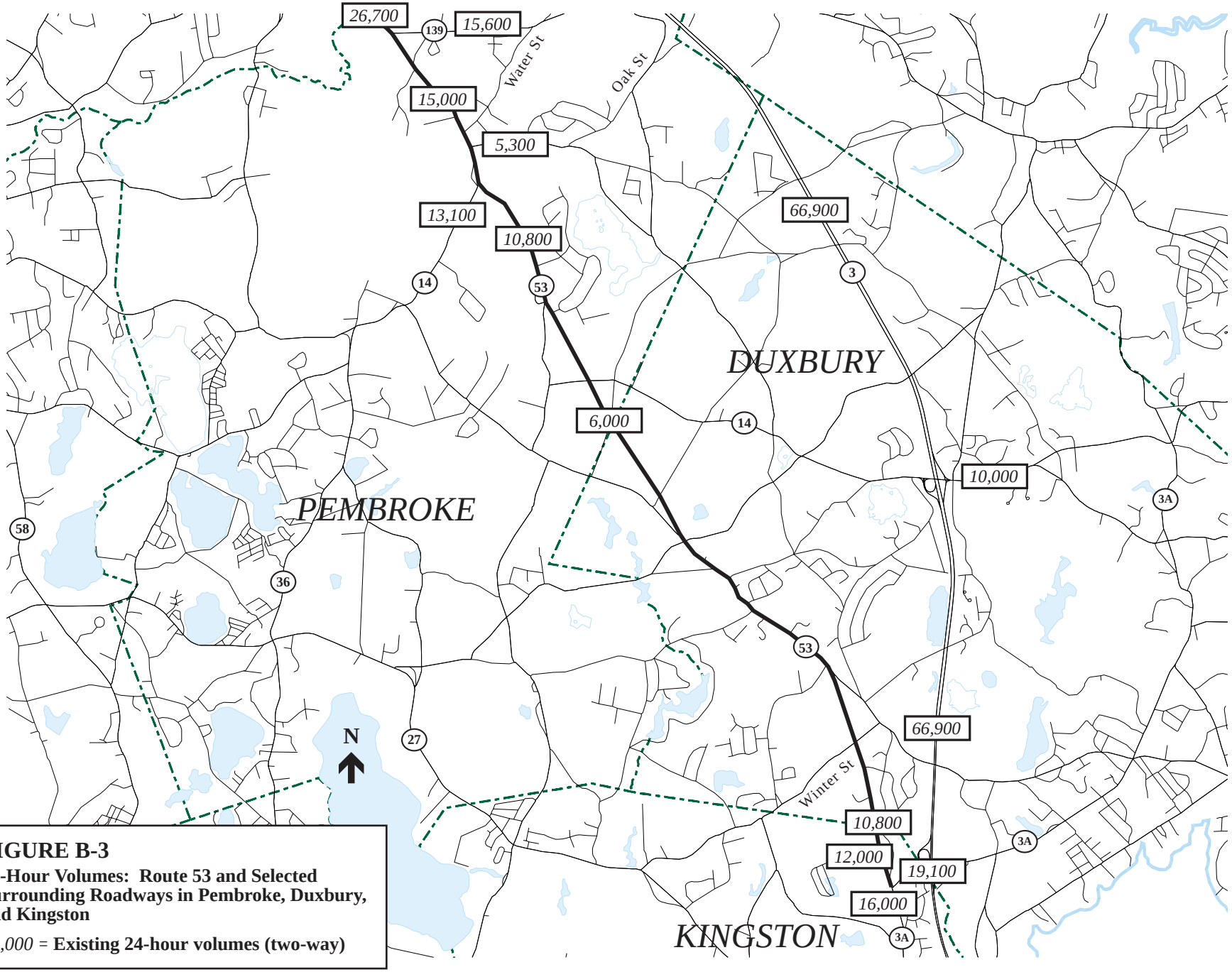


FIGURE B-3

24-Hour Volumes: Route 53 and Selected Surrounding Roadways in Pembroke, Duxbury, and Kingston

00,000 = **Existing 24-hour volumes (two-way)**

TABLE B-1

ROUTE 53 CORRIDOR TRANSPORTATION PLAN

Base Year Traffic Counts

QUINCY	S or U (*)	MTMC or ATR (**)	Count Date	Counted by	24-Hour AWDT	Total Pk Hr Intersection Volume AM Pk Hr	Total Pk Hr Intersection Volume PM Pk Hr	Actual AM and PM Peak Hours
- I-93/Route 3 n. of Furnace Brook Pkwy		ATR	1999	MassHighway	192,500 (ADT)			
- I-93/Route 3 s. of Furnace Brook Pkwy		ATR	1999	MassHighway	194,500 (ADT)			
- Route 53 at Route 3A (Washington St)	S	MTMC	1999	Quincy Tr./Pk.		3,350	3,560	
- Route 53 at Fifth St	S	MTMC	1999	Quincy Tr./Pk.		1,130	1,070	
- Route 53 at South St	S	MTMC	1999	Quincy Tr./Pk.		1,530	1,530	
- Route 53 at Quincy Ave	S	MTMC	1999	Quincy Tr./Pk.		3,100	3,600	
- Route 53 n. of East Howard St		ATR	1999	CTPS (est.)	27,600 (ADT)			
		ATR	1987	MassHighway	20,500 (ADT)			
- Route 53 at East Howard St	S	MTMC	2001	CTPS		2,590	2,990	7:30-8:30; 17:00-18:00

(*) S=signalized intersection; U=unsignalized intersection

(**) MTMC=manual turning movement count (AM/PM peak hour); ATR=automatic traffic recorder (24-hour count)

(ReS, 031031, 53BsCnts.xls)

TABLE B-2

ROUTE 53 CORRIDOR TRANSPORTATION PLAN

Base Year Traffic Counts

BRAINTREE	S or U (*)	MTMC or ATR (**)	Count Date	Counted by	24-Hour AWDT	Total Pk Hr Inter-section Volume AM Pk Hr	Total Pk Hr Inter-section Volume PM Pk Hr	Actual AM and PM Peak Hours
- Route 3 s. of Burgin Pkwy		ATR	1999	MassHighway	162,300 (ADT)			
- Route 3 n. of Route 18		ATR	1999	MassHighway	145,800 (ADT)			
- Route 53 s. of Quincy line		ATR	1999	F, S & T	23,200			
- Howard St s. of Quincy line		ATR	1999	F, S & T	4,800			
- Shaw St s. of Howard St		ATR	1999	Norfolk County	4,600			
- Howard St at Hayward St	U	MTMC	1999	F, S & T		1,120	1,160	8:00-9:00; 16:15-17:15
- Route 53 at Hayward St	S	MTMC	1999	F, S & T		1,980	2,010	7:15-8:15; 17:00-18:00
- Route 53 at Commercial St	S	MTMC	2002	TDC (HTSD)		2,960	3,040	
			1999	F, S & T		3,150	3,580	7:15-8:15; 17:00-18:00
- Route 53 s. of Norfolk Square		ATR	1999	F, S & T	33,000			

(*) S=signalized intersection; U=unsignalized intersection

(**) MTMC=manual turning movement count (AM/PM peak hour); ATR=automatic traffic recorder (24-hour count)

(ReS, 031031, 53BsCnts.xls)

TABLE B-3

ROUTE 53 CORRIDOR TRANSPORTATION PLAN

Base Year Traffic Counts

WEYMOUTH	S or U (*)	MTMC or ATR (**)	Count Date	Counted by	24-Hour AWDT	Total Pk Hr Intersection Volume AM Pk Hr	Total Pk Hr Intersection Volume PM Pk Hr	Actual AM and PM Peak Hours
- Route 3 s. of Route 18		ATR	1999	MassHighway	114,000 (ADT)			
- Route 18 s. of Route 3		ATR	1996	MassHighway	37,800 (ADT)			
- Route 53 at Route 18 (Main St)	S	MTMC	1999	TDC (Rizzo)		1,700	2,190	7:30-8:30; 16:15-17:15
				Wilbur Smith		1,720	2,290	
- Route 18 at Winter St	S	MTMC	1999	Wilbur Smith		2,040	2,260	
- Route 53 at Winter Ct/residential driveway	U	MTMC	2000	HTSD			60 (turns)	-- ; 16:00-17:00
- Route 53 at Heating & Plumbing driveway	U	MTMC	2000	HTSD			20 (turns)	-- ; 16:45-17:45
- Route 53 at Papa Gino's driveway	U	MTMC	2000	HTSD			30 (turns)	-- ; 17:00-18:00
- Route 53 n. of Middle St		ATR	2000	HTSD	17,200			
- Route 53 at Middle St	S	MTMC	2001	CTPS		2,650		8:00-9:00; --
			2000	HTSD			2,810	-- ; 17:00-18:00
			1998	VHB			2,770	-- ; 17:00-18:00
- Route 53 at Shaw's/Stop & Shop driveways	U	MTMC	1998	VHB			1,980	-- ; 17:00-18:00
- Middle St at Papa Gino's/gas station driveways	U	MTMC	2000	HTSD			1,530	-- ; 17:00-18:00
- Middle St at Winter St	U	MTMC	1997	VHB			2,100	-- ; 16:30-17:30
- Middle St at Stop & Shop driveway	U	MTMC	1998	VHB			1,330	-- ; 16:45-17:45
- Route 53 n. of Pleasant St		ATR	1996	MassHighway	12,600 (ADT)			
- Route 53 at Pleasant St	S	MTMC	2000	Vanasse & Ass.		2,620	2,270	7:30-8:30; 16:45-17:45
- Pleasant St n. of Elm St		ATR	1996	MassHighway	12,600 (ADT)			

(*) S=signalized intersection; U=unsignalized intersection

(**) MTMC=manual turning movement count (AM/PM peak hour); ATR=automatic traffic recorder (24-hour count)

(ReS, 031031, 53BsCnts.xls)

TABLE B-4

ROUTE 53 CORRIDOR TRANSPORTATION PLAN

Base Year Traffic Counts

HINGHAM	S or U (*)	MTMC or ATR (**)	Count Date	Counted by	24-Hour AWDT	Total Pk Hr Inter-section Volume AM Pk Hr	Total Pk Hr Inter-section Volume PM Pk Hr	Actual AM and PM Peak Hours
- Route 3 n. of Hingham St		ATR	1999	MassHighway	105,700 (ADT)			
- Route 53 s. of Weymouth line		ATR (Stn. 28)	2000	MassHighway	11,000 (ADT)			
- Route 53 n. of Old Ward St		ATR	2000	Vanasse & Ass.	13,300			
- Route 53 at Old Ward St	U	MTMC	2000	Vanasse & Ass.		1,340	990	7:15-8:15; 16:30-17:30
- Route 53 n. of Cushing St		ATR	1996	MassHighway	11,200 (ADT)			
- Route 53 at Cushing St	S	MTMC	1999	Vanasse & Ass.		1,860	1,730	7:30-8:30; 16:15-17:15
- Route 53 at Derby St/Gardner St	S	MTMC	1999	Vanasse & Ass.		2,730	2,240	7:15-8:15; 16:45-17:45
				Wilbur Smith		2,000	2,200	
- Derby St at Cushing St/residential driveway	S	MTMC	1999	Vanasse & Ass.		2,030	2,320	7:30-8:30; 16:45-17:45
				Wilbur Smith		1,840	2,170	
- Derby St w. of Cushing St		ATR	1999	Vanasse & Ass.	25,990			
- Derby St e. of Route 3		ATR	1996	MassHighway	16,600 (ADT)			
- Derby St at Route 3 NB ramps	S	MTMC	2000	Vanasse & Ass.		2,680	3,410	
			1999	Wilbur Smith		2,370	2,800	
- Derby St at Route 3 SB ramps	S	MTMC	1999	Vanasse & Ass.		2,260	3,130	8:00-9:00; 16:45-17:45
				Wilbur Smith		2,170	2,890	
- Cushing St at Ward St	U	MTMC	2000	Vanasse & Ass.		720	810	8:00-9:00; 16:45-17:45
- Ward St s. of Old Ward St		ATR	2000	Vanasse & Ass.	5,340			
- Route 53 at Farm Hills Lane	U	MTMC	1999	Wilbur Smith		1,400	1,660	
- Route 53 n. of Route 228		ATR	1999	MassHighway	20,300 (ADT)			
- Route 228 n. of Route 53		ATR	1999	Vanasse & Ass.	19,870			
			1996	MassHighway	22,300 (ADT)			
- Route 228 at Gardner St/Scotland St	U	MTMC	1999	Vanasse & Ass.			1,700	-- ; 17:00-18:00
			1996	VHB		1,040	1,560	

(*) S=signalized intersection; U=unsignalized intersection

(**) MTMC=manual turning movement count (AM/PM peak hour); ATR=automatic traffic recorder (24-hour count)

(ReS, 031031, 53BsCnts.xls)

TABLE B-5

ROUTE 53 CORRIDOR TRANSPORTATION PLAN

Base Year Traffic Counts

NORWELL	S or U (*)	MTMC or ATR (**)	Count Date	Counted by	24-Hour AWDT	Total Pk Hr Intersection Volume AM Pk Hr	Total Pk Hr Intersection Volume PM Pk Hr	Actual AM and PM Peak Hours
- Route 3 s. of Hingham St		ATR	1999	MassHighway	93,000 (ADT)			
- Route 53 at Route 228	S	MTMC	1999	Wilbur Smith		2,770	3,100	-- ; 16:30-17:30
				Vanasse & Ass.			2,920	
			1984	VHB		2,750	3,180	7:30-8:30; 16:15-17:15
- Hingham St at Route 3 NB ramps (Rockland)	S	MTMC	1999	Wilbur Smith		3,200	3,210	
- Hingham St at Route 3 SB ramps/Home Depot (Rockland)	S	MTMC	1999	Wilbur Smith		3,100	4,080	
- Route 53 s. of Route 228		ATR	1999	Vanasse & Ass.	26,410			
			1994	MassHighway	29,000 (ADT)			
- Route 53 n. of Grove St/High St		ATR	2001	Rizzo Assoc.	28,870			
- Route 53 at Grove St/High St	S	MTMC	2001	CTPS		2,070		7:45-8:45; --
			1999	Vanasse & Ass.			2,570	-- ; 16:30-17:30
			1997	VHB			2,420	-- ; 16:30-17:30
- Route 53 at Jacob's Trail	U	MTMC	1997	VHB			1,440	-- ; 17:00-18:00
- Route 53 s. of Jacob's Trail		ATR	1998	VHB	14,200 (ADT)			
- Route 53 n. of Route 123		ATR	1995	MassHighway	15,000 (ADT)			

(*) S=signalized intersection; U=unsignalized intersection

(**) MTMC=manual turning movement count (AM/PM peak hour); ATR=automatic traffic recorder (24-hour count)

(ReS, 031031, 53BsCnts.xls)

TABLE B-6

ROUTE 53 CORRIDOR TRANSPORTATION PLAN

Base Year Traffic Counts

HANOVER	S or U (*)	MTMC or ATR (**)	Count Date	Counted by	24-Hour AWDT	Total Pk Hr Intersection Volume AM Pk Hr	Total Pk Hr Intersection Volume PM Pk Hr	Actual AM and PM Peak Hours
- Route 3 s. of Route 53		ATR	1999	MassHighway	80,000 (ADT)			
- Route 53 at Route 123 (Webster St)	S	MTMC	2000	TDC (HTSD)		1,870	2,630	7:45-8:45; 17:00-18:00
			1998	VHB			2,300	-- ; 16:45-17:45
- Route 123 (Webster St) at Main St	S	MTMC	1997	VHB			1,750	-- ; 16:30-17:30
- Route 53 at Route 3 NB ramps/Sunoco gas station	U	MTMC	1999	TDC (HTSD)		2,480	3,030	7:45-8:45; 16:45-17:45
			1997	VHB			2,400	-- ; 16:45-17:45
- Route 53 at Route 3 SB ramps/mall driveway	S	MTMC	1999	TDC (HTSD)		2,180	3,790	8:00-9:00; 16:45-17:45
			1997	VHB			2,940	-- ; 16:45-17:45
- Route 53 Hanover Mall main driveway	S	MTMC	2000	TDC (HTSD)		1,440	2,340	8:00-9:00; 16:30-17:30
- Route 53 at Mill St/Frank's Lane	S	MTMC	2000	TDC (HTSD)		1,590	2,520	7:15-8:15; 16:45-17:45
- Route 53 s. of Mill St		ATR	1996	VHB	29,700 (ADT)			
- Route 53 n. of Pond St		ATR	1996	VHB	29,100 (ADT)			
- Route 53 at Old Washington St	S	MTMC	2000	TDC (HTSD)		1,570	2,320	7:15-8:15; 17:00-18:00
			1996	VHB		1,590	2,410	
- Old Washington St w. of Route 53		ATR	1996	VHB	7,700			
- Route 53 s. of Pond St		ATR	1996	VHB	26,000 (ADT)			
- Route 53 at East St	U	MTMC	2001	CTPS		1,520	2,080	7:45-8:45; 16:30-17:30
			1996	VHB		1,380	2,190	
- Route 53 at Route 139 (Rockland St)	S	MTMC	2000	TDC (HTSD)		2,010	2,960	8:00-9:00; 16:30-17:30
- Route 139 (Rockland St) w. of Route 53		ATR (Stn. 29)	1993	MassHighway	12,910 (ADT)			
- Route 53 at Broadway	S	MTMC	2000	CTPS		2,070	2,990	6:30-7:30; 16:30-17:30
			2000	TDC (HTSD)		2,160	2,940	7:15-8:15; 16:30-17:30

(*) S=signalized intersection; U=unsignalized intersection

(**) MTMC=manual turning movement count (AM/PM peak hour); ATR=automatic traffic recorder (24-hour count)

(ReS, 031031, 53BsCnts.xls)

TABLE B-7

ROUTE 53 CORRIDOR TRANSPORTATION PLAN

Base Year Traffic Counts

PEMBROKE	S or U (*)	MTMC or ATR (**)	Count Date	Counted by	24-Hour AWDT	Total Pk Hr Inter-section Volume AM Pk Hr	Total Pk Hr Inter-section Volume PM Pk Hr	Actual AM and PM Peak Hours
- Route 3 s. of Route 139		ATR	1999	MassHighway	66,900 (ADT)			
- Route 53 at Hanover line		ATR	2000	OCPC	26,730			
			1997	OCPC	23,620 (ADT)			
			1992	MassHighway	26,800 (ADT)			
- Route 53 at Route 139 (Schooset St)	S	MTMC	2000	TDC (HTSD)		1,720	2,380	7:30-8:30; 16:30-17:30
- Route 139 (Schooset St) e. of Route 53		ATR	1997	OCPC	15,590 (ADT)			
- Route 53 s. of Brick Kiln Lane		ATR	1996	MassHighway	15,000 (ADT)			
- Route 53 at Water St	U	MTMC	2000	CTPS		1,210	1,650	7:15-8:15; 17:00-18:00
- Route 53 at Pleasant St	U	MTMC	2001	CTPS		1,590	2,020	7:15-8:15; 16:30-17:30
- Pleasant St e. of Route 53		ATR	2001	OCPC	5,300			
- Route 53 n. of Route 14 (Barker St)		ATR	1992	MassHighway	20,900 (ADT)			
- Route 53 at Route 14 (Barker St)	S	MTMC	2001	OCPC		--	2,030	-- ; 16:00-17:00
- Route 14 (Barker St/Center St) w. of Route 53		ATR	2001	OCPC	13,100			
			1989	OCPC	12,400			
- Route 53 s. of Route 14 (Barker St)		ATR	2001	OCPC	10,800			
			1992	MassHighway	10,500 (ADT)			
- Route 53 n. of Route 14 (Congress St)		ATR	1992	MassHighway	7,600 (ADT)			
- Route 14 (Congress St) e. of Route 53		ATR	1989	OCPC	2,300			
- Route 53 at Duxbury line		ATR	1997	OCPC	6,030 (ADT)			

(*) S=signalized intersection; U=unsignalized intersection

(**) MTMC=manual turning movement count (AM/PM peak hour); ATR=automatic traffic recorder (24-hour count)

(ReS, 031031, 53BsCnts.xls)

TABLE B-8

ROUTE 53 CORRIDOR TRANSPORTATION PLAN

Base Year Traffic Counts

DUXBURY	S or U (*)	MTMC or ATR (**)	Count Date	Counted by	24-Hour AWDT	Total Pk Hr Inter-section Volume		Actual AM and PM Peak Hours
						AM Pk Hr	PM Pk Hr	
- Route 3 s. of Route 14		ATR	1999	MassHighway	66,900 (ADT)			
- Route 53 at Winter St	U	MTMC	2001	CTPS		760	1,120	8:00-9:00; 16:45-17:45

(*) S=signalized intersection; U=unsignalized intersection

(**) MTMC=manual turning movement count (AM/PM peak hour); ATR=automatic traffic recorder (24-hour count)

(ReS, 031031, 53BsCnts.xls)

TABLE B-9

ROUTE 53 CORRIDOR TRANSPORTATION PLAN

Base Year Traffic Counts

KINGSTON	S or U (*)	MTMC or ATR (**)	Count Date	Counted by	24-Hour AWDT	Total Pk Hr Intersection Volume AM Pk Hr	Total Pk Hr Intersection Volume PM Pk Hr	Actual AM and PM Peak Hours
- Route 53 (Summer St) at Duxbury line		ATR	2001	OCPC	10,820			
			1997	OCPC	10,690 (ADT)			
- Route 53 at Silver Birch Lane	U	MTMC	2002	CTPS		660	1,010	7:45-8:45; 17:00-18:00
- Route 53 at Tar Kiln Rd/CVS north driveway	U	MTMC	2002	CTPS		960	1,310	8:15-9:15; 16:00-17:00
- Route 53 at Tar Kiln Rd/Kingsbury Club south driveway	U	MTMC	1998	VHB			1,130	-- ; 16:15-17:15
- Route 53 n. of Route 3A (Tremont St)		ATR	2001	OCPC	11,950			
			1987	VHB	10,790 (ADT)			
- Route 53 at Route 3A	S	MTMC	2001	CTPS		1,680		8:15-9:15; --
			2001	OCPC			2,590	-- ; 16:45-17:45
			1998	VHB			2,470	-- ; 16:00-17:00
			1987	Storch Engrs.			2,270	
- Route 3A (Summer St) s. of Route 53		ATR	2001	OCPC	16,000			
			1997	OCPC	17,310 (ADT)			
- Route 3A at Duxbury line (e. of Route 53)		ATR	2001	OCPC	19,100			
			1999	MassHighway	15,600 (ADT)			
			1996	OCPC	15,720 (ADT)			
			1992	MassHighway	13,000 (ADT)			

(*) S=signalized intersection; U=unsignalized intersection

(**) MTMC=manual turning movement count (AM/PM peak hour); ATR=automatic traffic recorder (24-hour count)

(ReS, 031031, 53BsCnts.xls)

Table B-10 lists the intersections in the Route 53 corridor for which crash data were summarized in tabular format and for which collision diagrams were created. Also shown are the intersection crash rates, expressed as crashes per million entering vehicles (MEV), and, for comparative purposes, the applicable MassHighway district crash-rate averages.

TABLE B-10
Intersections Summarized for Collision Diagrams and Crash Rates for the Route 53 Corridor

Town	Route 53 Intersection	Crash rate	Average 2003 Crash Rates by MassHighway District	
			District 4	District 5
Quincy	East/West Howard Street (Table B-11, Fig. B-4)	0.91	0.87	—
Braintree	No single intersection. The #400–499 and #200–299 blocks with many side streets and driveways (Tables B-12a and B-12b, Figs. B-5a and B-5b)	—	—	—
Weymouth	Pleasant Street (Table B-13, Fig. B-6)	0.94	0.87	—
Hingham	Derby Street/Gardner Street (Table B-14, Fig. B-7)	1.54	—	0.85
Norwell	All the major Route 53 intersections (Queen Anne's Corner, Grove Street/ High Street, Jacob's Trail) have either been improved or are scheduled for improvement; no crash diagrams created	—	—	—
Hanover	Broadway (Table B-15, Fig. B-8)	0.55	—	0.85
Pembroke	Pleasant Street (Table B-16, Fig. B-9)	0.61	—	0.61
Duxbury	Winter Street (Table B-17, Fig. B-10)	1.62	—	0.61
Kingston	Tar Kiln Road (Table B-18, Fig. B-11)	0.94	—	0.61

Note: The average 2003 MassHighway crash rates of 0.87 and 0.85 in Districts 4 and 5, respectively, are for signalized intersections; the crash rate of 0.61 in District 5 is for unsignalized intersections.

Tables B-11 through B-18 and Figures B-4 through B-11 describe the crash data summaries and collision diagrams, respectively.

TABLE B-11

Summary of Local Police Accident Data (1/1/99–8/31/01) Route 53
at East/West Howard Street, Quincy
(SIGNALIZED)

		1999	2000	2001
Collision Type	Rear-End	3	6	5
	Head-On	0	0	0
	Angle	12	4	3
	Other	0	0	0
	Total	15	10	8
Severity	Property Damage	Information Not Available		
	Personal Injury			
	Fatality			
Time of Day	7:00–9:00 AM			
	4:00–6:00 PM			
	Other			
Day of Week	Mon–Fri			
	Sat–Sun			
Pavement Conditions	Dry	10	9	6
	Wet	4	1	2
	Ice/Snow	1	0	0
Light Conditions	Daylight	8	5	5
	Dawn or Dusk	1	0	0
	Dark–No lights	0	0	0
	Dark–Lighted	6	5	3
Weather Conditions	Clear	8	9	6
	Foggy/Cloudy	2	1	2
	Rain	4	0	0
	Snow/Sleet	1	0	0
	Other	0	0	0

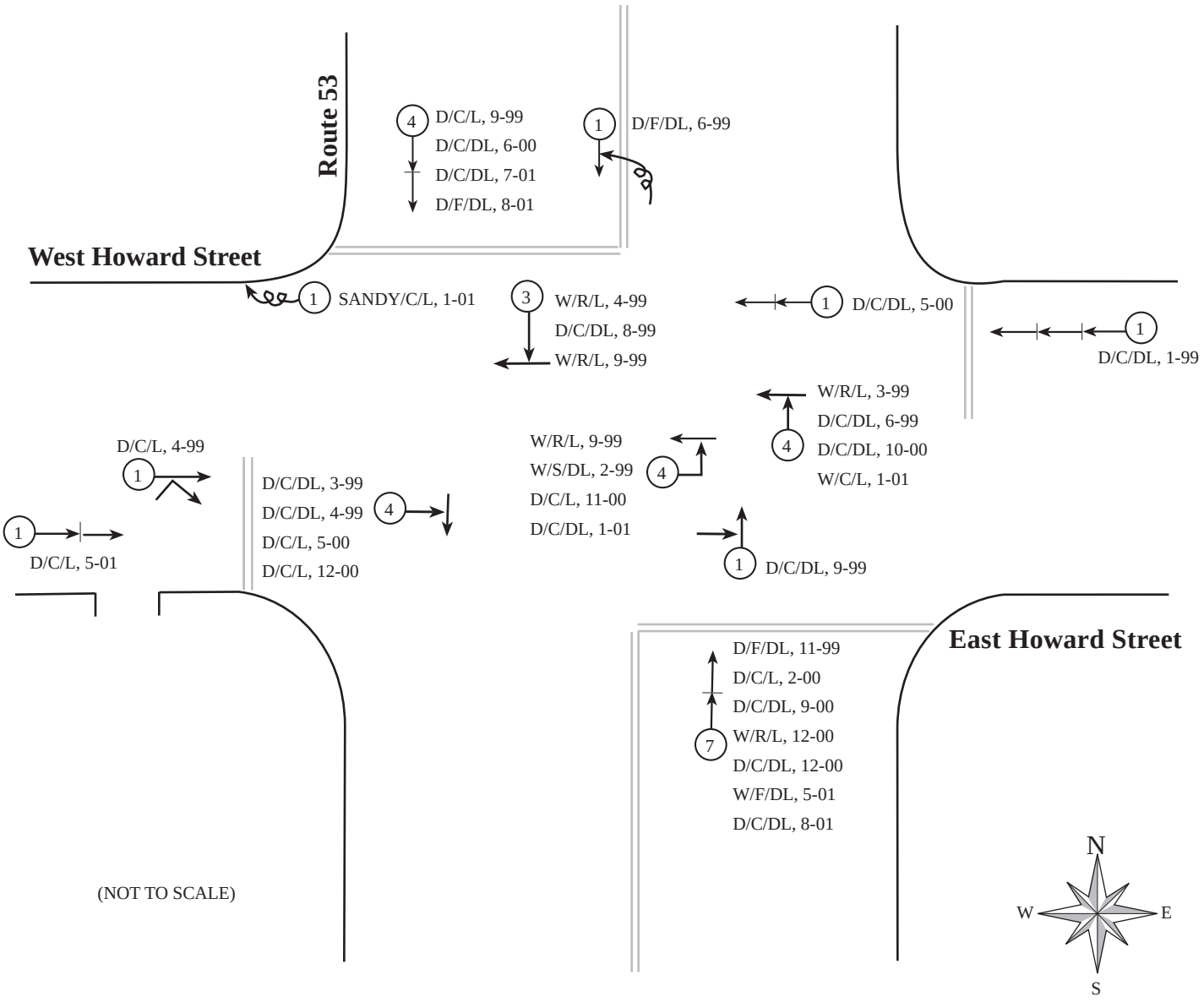
Note: Data for 2001 are available only through August 31.

Based on Quincy Police Department data summarized in Table B-11 and Figure B-4, 33 crashes were recorded at Route 53 and East/West Howard Street during a two-year-and-eight-month period, January 1999 through August 2001. Of these, 58% were angle crashes and 42% were rear-end crashes.

The intersection's overall traffic volumes, as well as its geometric layout and grade, appear to contribute to the number of crashes. The East and West Howard Street approaches are slightly offset, the Route 53 northbound and West Howard Street approaches are on uphill grades, and the Route 53 southbound and East Howard Street approaches are on downhill grades.

This location experiences among the highest daily volumes in the Route 53 corridor. It also has a high percentage of left turns from East and West Howard Street during the AM and PM peak hours which contributes to the prevalence of angle crashes in the intersection. The large proportion of rear-end crashes are due to heavy stop-and-go traffic on all approaches, particularly on Route 53.

Figure B-4
Collision Diagram
1/1/99 to 8/31/01
Route 53 @ East/West Howard Street (Signalized)
Quincy



SYMBOLS	PAVEMENT/WEATHER/LIGHTING	TYPES OF COLLISIONS
Moving Vehicle	D Dry	Head On
Backing Vehicle	C Clear	Angle
Pedestrian/Bicycle	W Wet	Rear End
Parked Vehicle	R Rain	Sideswipe
Property Damage Only	F Foggy/Cloudy	Broadside
Injury	S Snowy, Icy	
Fatality	O Other	
Fixed Object	DL Daylight	
Out of Control	N Dark – No Lights	
# Number of Accidents	L Dark – Lighted	

CTPS

TABLE B-12a
Summary of Local Police Accident Data (1/1/99–6/30/01)
Route 53: #400-499 Blocks, Braintree
(Includes no signalized intersections; two unsignalized side streets)

		1/1/99–12/31/99	1/1/00–12/31/00	1/1/01–6/30/01
Collision Type	Rear-End	1	1	0
	Head-On	0	0	0
	Angle	10	5	1
	Other	1	1	0
	Total	12	7	1
Severity	Property Damage	6	4	0
	Personal Injury	6	3	1
	Fatality	0	0	0
Time of Day	7:00–9:00 AM	0	1	0
	4:00–6:00 PM	2	0	0
	Other	10	6	1
Day of Week	Mon-Fri	10	6	1
	Sat-Sun	2	1	0
Pavement Conditions	Dry	12	3	0
	Wet	0	4	1
	Ice/Snow	0	0	0
Light Conditions	Daylight	10	5	1
	Dawn or Dusk	0	0	0
	Dark-No lights	0	0	0
	Dark-Lighted	2	2	0
Weather Conditions	Clear	11	3	0
	Foggy/Cloudy	1	0	0
	Rain	0	4	1
	Snow/Sleet	0	0	0
	Other	0	0	0

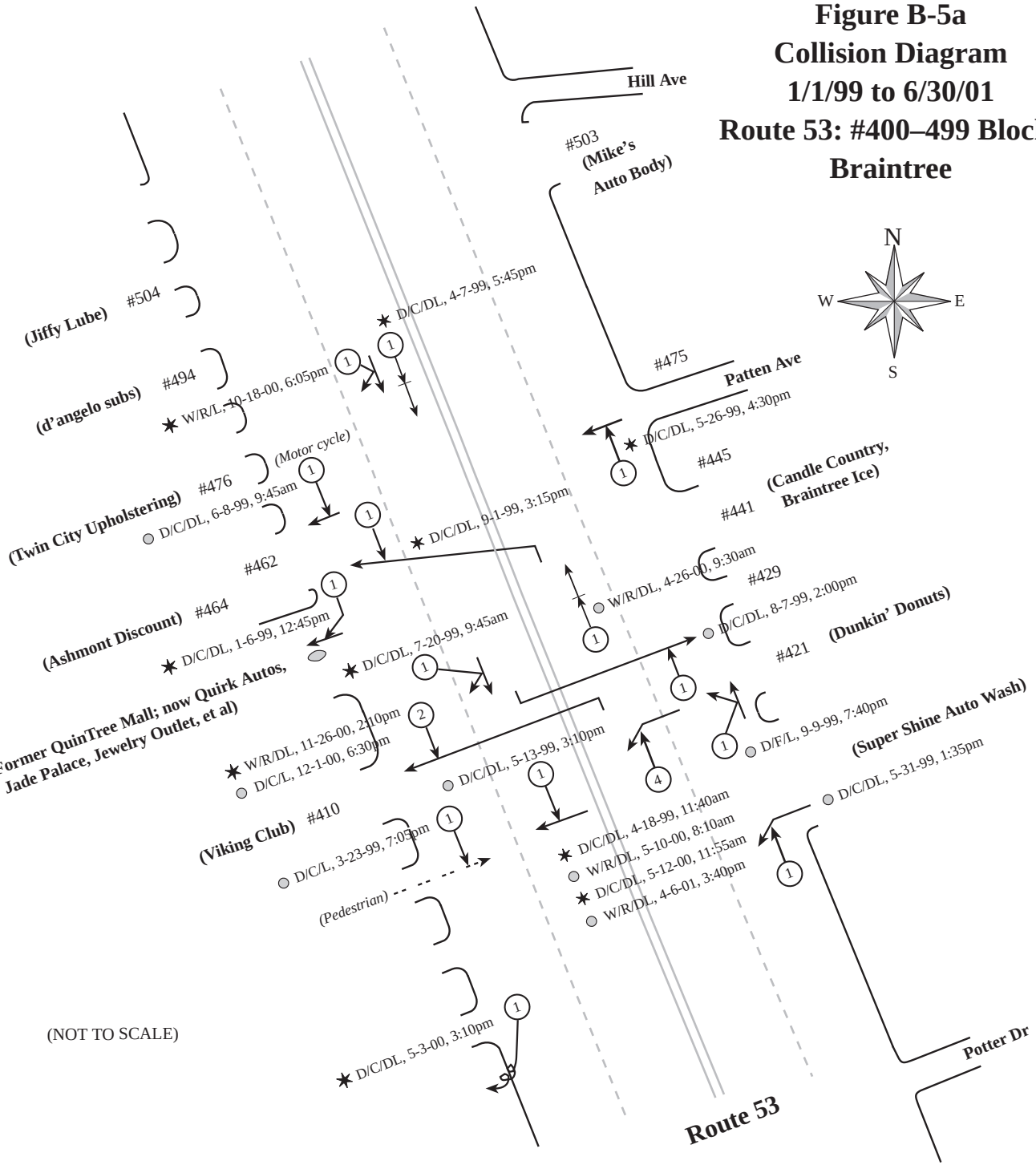
Note: Data for 2001 only available through 30 June.

Based on Braintree Police Department data summarized in Table B-12a and Figure B-5a, 20 crashes were recorded in the #400–499 blocks of Route 53 during a two-year and six-month period, January 1999 through June 2001. Of these, 80% were angle crashes.

This section of Route 53 is four-lane, undivided, with numerous driveways. The section is on a straight incline, with the southern end being more elevated than the northern end.

More than one-third of all crashes involved vehicles entering or exiting the Dunkin' Donuts driveway located on the northbound side. The posted speed limit is 35 mph, but field observations indicated that traffic regularly exceeded 40–45 mph. The posted speed limit of 35 mph appeared often to be exceeded. This presumably contributed to the prevalence of crashes, as vehicles entering or exiting driveways across two lanes were not able to maneuver fast enough to avoid colliding with oncoming through traffic. This also helps to explain why a full 50% of all crashes involved personal injuries.

Figure B-5a
Collision Diagram
1/1/99 to 6/30/01
Route 53: #400–499 Blocks
Braintree



SYMBOLS		PAVEMENT/WEATHER/LIGHTING		TYPES OF COLLISIONS	
←	Moving Vehicle	D	Dry	→ ←	Head On
←≈	Backing Vehicle	C	Clear	↙	Angle
- - -	Pedestrian/Bicycle	W	Wet	← ←	Rear End
▨	Parked Vehicle	R	Rain	↙ ↖	Sideswipe
✶	Property Damage Only	F	Foggy/Cloudy	↓ ←	Broadside
○	Injury	S	Snowy, Icy		
●	Fatality	O	Other		
□	Fixed Object	DL	Daylight		
↰	Out of Control	N	Dark – No Lights		
(#)	Number of Accidents	L	Dark – Lighted		CTPS

TABLE B-12b
Summary of Local Police Accident Data (1/1/99–6/30/01)
Route 53: #200–299 Blocks, Braintree
(Includes one signalized intersection, Route 53 at Hayward Street/Potter Drive; eight unsignalized side streets)

		1/1/99–12/31/99	1/1/00–12/31/00	1/1/01–6/30/01
Collision Type	Rear-End	5	4	1
	Head-On	0	0	0
	Angle	8	3	0
	Other	0	1	2
	Total	13	8	3
Severity	Property Damage	7	3	2
	Personal Injury	6	5	1
	Fatality	0	0	0
Time of Day	7:00–9:00 AM	3	0	1
	4:00–6:00 PM	2	0	0
	Other	8	8	2
Day of Week	Mon–Fri	11	6	2
	Sat–Sun	2	2	1
Pavement Conditions	Dry	6	4	2
	Wet	5	4	1
	Ice/Snow	1	0	0
Light Conditions	Daylight	8	4	1
	Dawn or Dusk	1	1	0
	Dark–No lights	0	0	0
	Dark–Lighted	3	3	2
Weather Conditions	Clear	7	4	2
	Foggy/Cloudy	1	1	1
	Rain	3	3	1
	Snow/Sleet	1	0	0
	Other	0	0	0

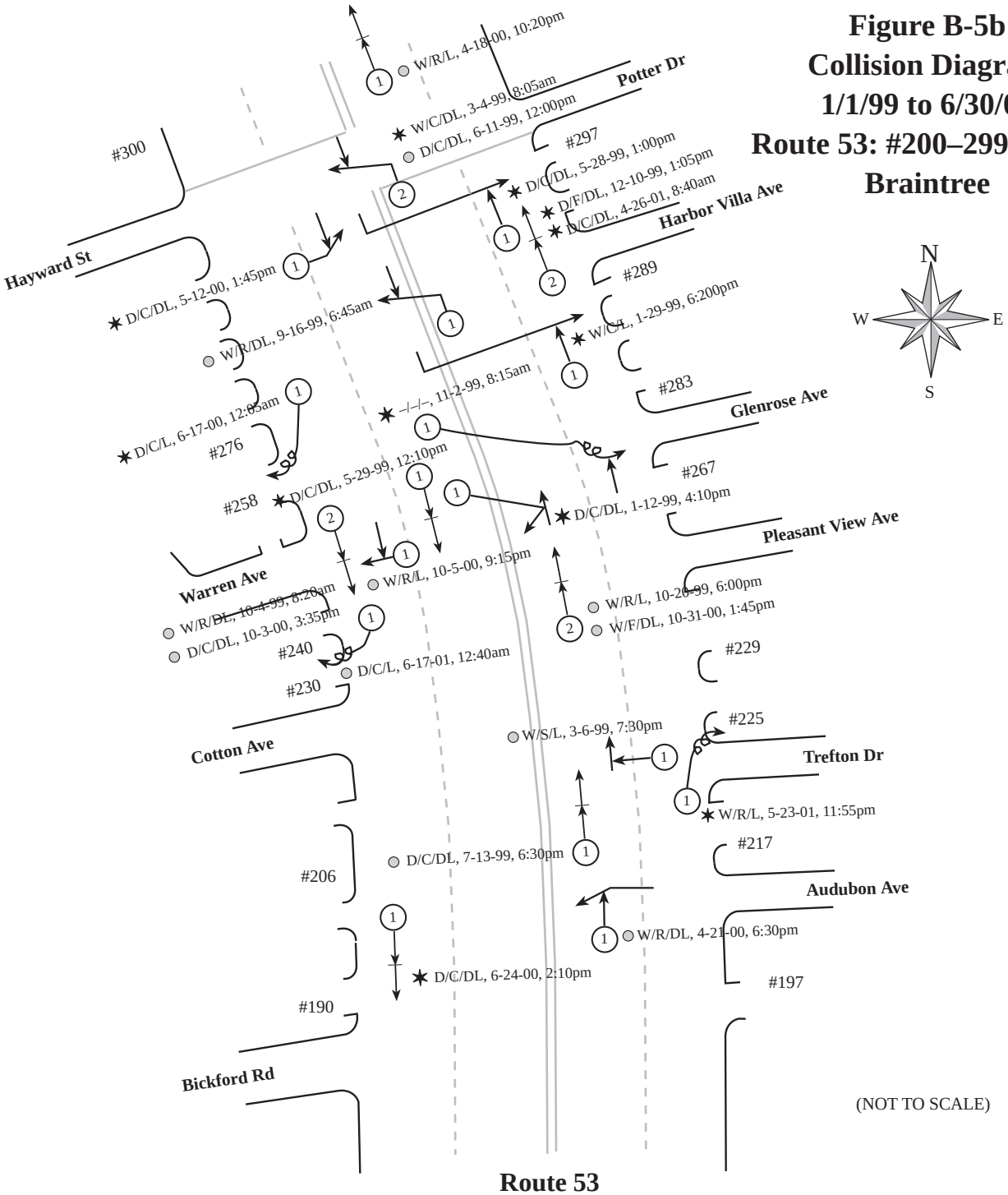
Note: Data for 2001 are available only through June 30.

Based on Braintree Police Department data summarized in Table B-12b and Figure B-5b, 24 crashes were recorded in the #200–299 blocks of Route 53 during a two-year and six-month period, January 1999 through June 2001. Of these, 46% were angle crashes and 42% were rear-end crashes.

This section of Route 53 is an undivided, hilly, curvy four-lane roadway which crests approximately at Trefton Drive. Numerous driveways and side streets invite left turns at locations where the line of sight may be obscured by a bend in the road or by the crest of the hill.

Just as in the #400–499 blocks, the posted speed limit of 35 mph appeared often to be exceeded. Since most of the crashes occurred during off-peak hours, it is likely that excessive speed was a contributing factor, particularly in those cases where the road surface was wet. Excessive speed may also explain the fact that 50% of all crashes on this section of Route 53 resulted in personal injury.

Figure B-5b
Collision Diagram
1/1/99 to 6/30/01
Route 53: #200–299 Blocks
Braintree



Route 53

SYMBOLS	PAVEMENT/WEATHER/LIGHTING	TYPES OF COLLISIONS
Moving Vehicle	D Dry	Head On
Backing Vehicle	C Clear	Angle
Pedestrian/Bicycle	W Wet	Rear End
Parked Vehicle	R Rain	Sideswipe
Property Damage Only	F Foggy/Cloudy	Broadside
Injury	S Snowy, Icy	
Fatality	O Other	
Fixed Object	DL Daylight	
Out of Control	N Dark – No Lights	
Number of Accidents	L Dark – Lighted	

CTPS

TABLE B-13
Summary of Local Police Accident Data (1/1/98–12/31/00)
Route 53 at Pleasant Street, Weymouth
(SIGNALIZED)

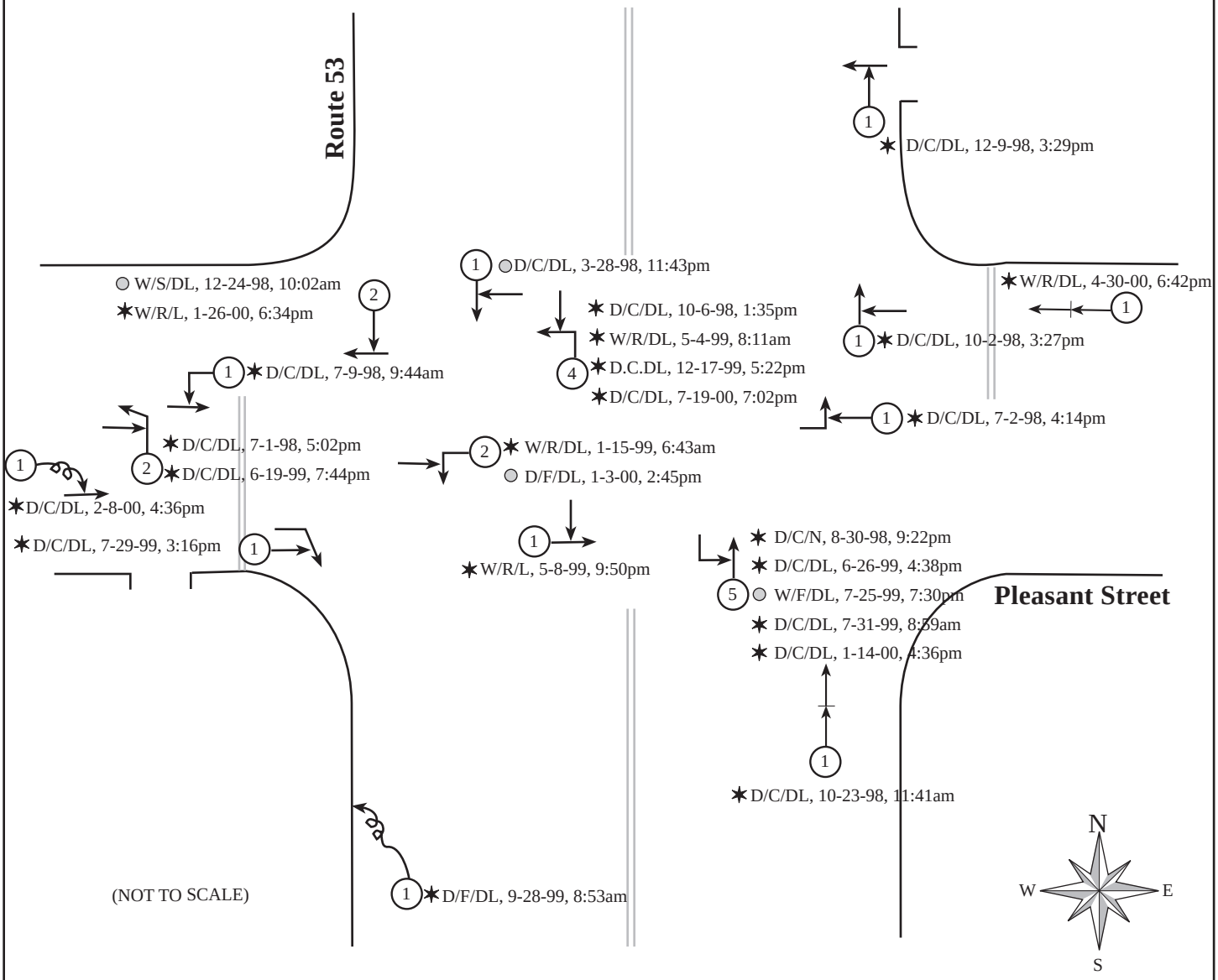
		1998	1999	2000
Collision Type	Rear-End	1	0	1
	Head-On	1	2	0
	Angle	8	7	5
	Other	0	1	0
	Total	10	10	6
Severity	Property Damage	8	9	5
	Personal Injury	2	1	1
	Fatality	0	0	0
Time of Day	7:00–9:00 AM	0	3	0
	4:00–6:00 PM	2	2	2
	Other	8	5	4
Day of Week	Mon–Fri	8	5	6
	Sat–Sun	2	5	0
Pavement Conditions	Dry	9	6	4
	Wet	0	4	2
	Ice/Snow	1	0	0
Light Conditions	Daylight	8	7	4
	Dawn or Dusk	0	2	1
	Dark–No lights	1	0	0
	Dark–Lighted	1	1	1
Weather Conditions	Clear	9	6	3
	Foggy/Cloudy	0	1	2
	Rain	0	3	1
	Snow/Sleet	1	0	0
	Other	0	0	0

Based on Weymouth Police Department data summarized in Table B-13 and Figure B-6, 26 crashes were recorded at Route 53 and Pleasant Street during a three-year period, 1999 through 2001. Of these, 77% were angle crashes.

This is a signalized intersection with two lanes on each of the four approaches. The signal is two-phased, and most of the traffic is processed as through movements, in the AM as well the PM peak periods. However, combined left turns from the four approaches colliding with through vehicles account for nearly half (46%) of all crashes. Vehicles entering or exiting driveways adjacent to the intersection were involved in 19% of the crashes.

Although sight distance does not appear to be an issue, excessive speed may be a factor in some crashes as vehicles were perhaps trying to "beat the yellow." Additionally, some turning vehicles may have misjudged gaps in the opposing traffic stream. The posted speed limit is 35 mph on Route 53, both north and south of the intersection.

Figure B-6
Collision Diagram
1/1/98 to 12/31/00
Route 53 @ Pleasant Street (Signalized)
Weymouth



SYMBOLS		PAVEMENT/WEATHER/LIGHTING		TYPES OF COLLISIONS	
←	Moving Vehicle	D	Dry	→ ←	Head On
←≈	Backing Vehicle	C	Clear	↙ ←	Angle
-- -- --	Pedestrian/Bicycle	W	Wet	← | ←	Rear End
▨	Parked Vehicle	R	Rain	↙ ↙	Sideswipe
✶	Property Damage Only	F	Foggy/Cloudy	↓ ←	Broadside
○	Injury	S	Snowy, Icy		
●	Fatality	O	Other		
□	Fixed Object	DL	Daylight		
↶	Out of Control	N	Dark – No Lights		
(#)	Number of Accidents	L	Dark – Lighted		

CTPS

TABLE B-14
Summary of Local Police Accident Data (1/1/98–12/31/00)
Route 53 at Derby Street and Gardner Street, Hingham
(SIGNALIZED)

		1998	1999	2000
Collision Type	Rear-End	3	7	6
	Head-On	0	0	0
	Angle	7	10	6
	Other	2	1	0
	Total	12	18	12
Severity	Property Damage	9	17	12
	Personal Injury	3	1	0
	Fatality	0	0	0
Time of Day	7:00–9:00 AM	1	5	4
	4:00–6:00 PM	3	5	1
	Other	8	8	7
Day of Week	Mon-Fri	10	15	10
	Sat-Sun	2	3	2
Pavement Conditions	Dry	7	14	4
	Wet	3	1	7
	Ice/Snow	2	3	1
Light Conditions	Daylight	10	14	9
	Dawn or Dusk	0	1	0
	Dark-No lights	0	0	0
	Dark-Lighted	2	3	3
Weather Conditions	Clear	6	12	5
	Foggy/Cloudy	1	2	2
	Rain	3	1	4
	Snow/Sleet	2	3	1
	Other	0	0	0

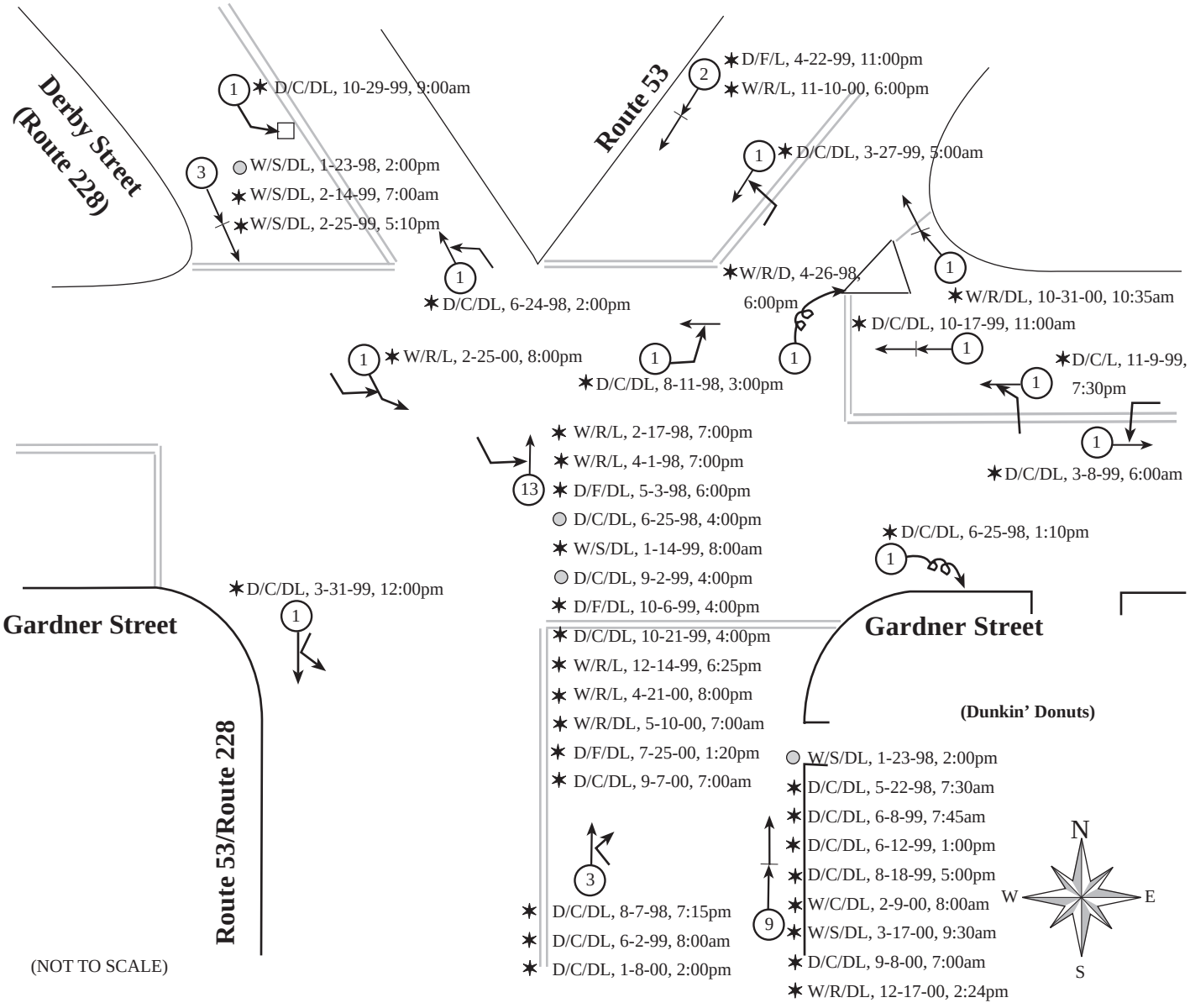
Based on Hingham Police Department data summarized in Table B-14 and Figure B-7, 42 crashes were recorded at Route 53 and Derby Street/Gardner Street during a three-year period, 1998 through 2000. Of these, 55% were angle crashes and 38% were rear-end crashes.

This is a signalized, five-legged intersection where two state-numbered routes merge/diverge (Route 53 and Route 228). Most of the approaches are at grade, except for Gardner Street eastbound which enters the intersection on a downgrade.

Nearly one-third (31%) of all crashes are associated with one single movement, vehicles turning left from Derby Street to Gardner Street eastbound. Although this movement has a short leading, protected phase before becoming permitted, there may be insufficient green time or vehicles may be attempting to "beat the yellow." Rear-end crashes, most of them associated with the Route 53 northbound approach, made up 38% of all crashes. One factor explaining these crashes may be through vehicles stopping short to let vehicles enter/exit the Dunkin' Donuts driveway on the southeast corner and being rear-ended as a result.

Finally, 24% of all collisions were assorted angle crashes and sideswipes, apparently due to lane shifting or vehicles entering/exiting adjacent driveways.

Figure B-7
Collision Diagram
1/1/98 to 12/31/00
Route 53 @ Derby Street/Gardner Street (Signalized)
Hingham



SYMBOLS		PAVEMENT/WEATHER/LIGHTING		TYPES OF COLLISIONS	
←	Moving Vehicle	D	Dry	→ ←	Head On
←≈	Backing Vehicle	C	Clear	↙	Angle
-- -- --	Pedestrian/Bicycle	W	Wet	←	Rear End
▨	Parked Vehicle	R	Rain	←	Sideswipe
✶	Property Damage Only	F	Foggy/Cloudy	↓ ←	Broadside
○	Injury	S	Snowy, Icy		
●	Fatality	O	Other		
□	Fixed Object	DL	Daylight		
↶	Out of Control	N	Dark – No Lights		
(#)	Number of Accidents	L	Dark – Lighted		

CTPS

TABLE B-15
Summary of Local Police Accident Data (1/1/98–12/31/00)
Route 53 at Broadway, Hanover
(SIGNALIZED)

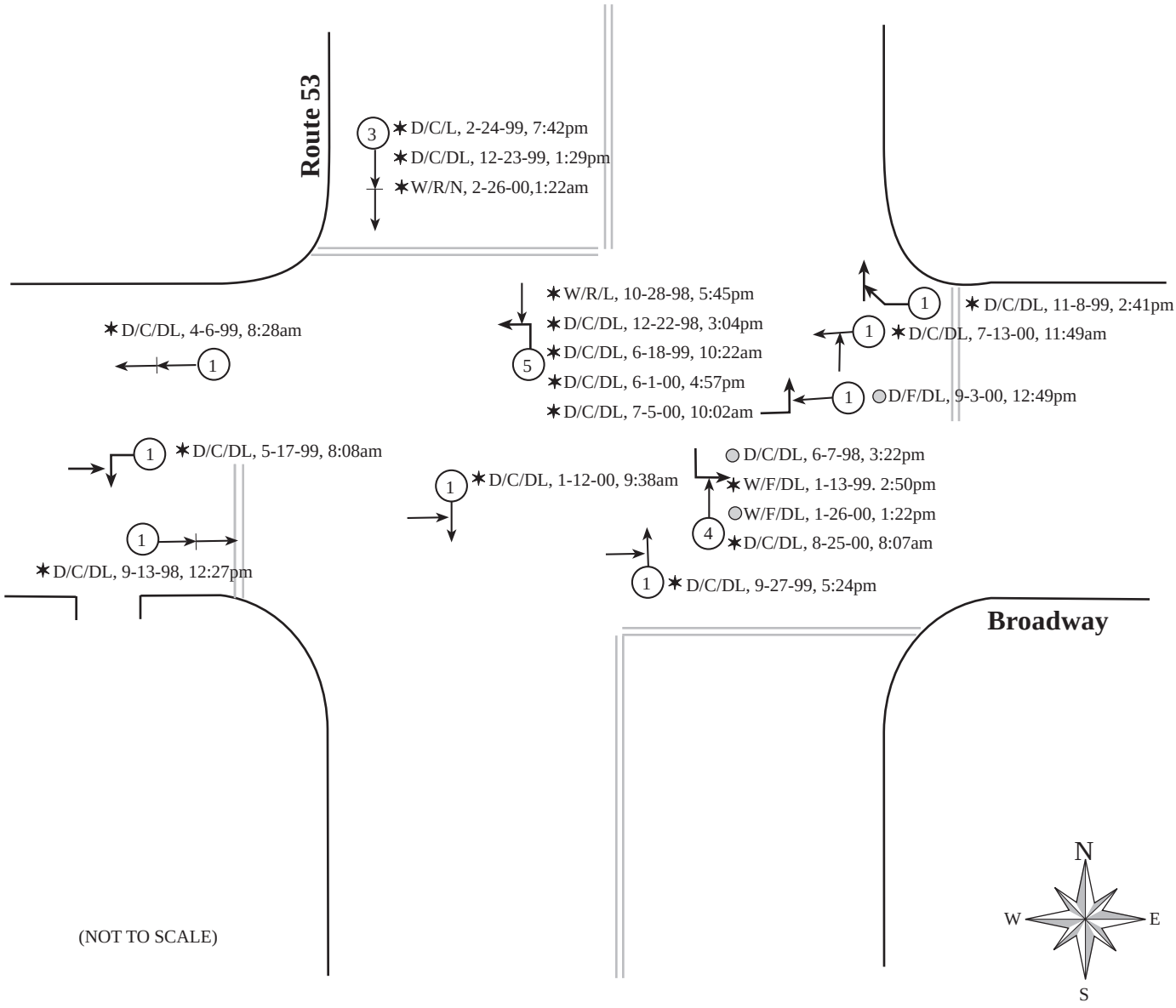
		1998	1999	2000
Collision Type	Rear-End	1	3	1
	Head-On	0	1	0
	Angle	3	4	7
	Other	0	0	0
	Total	4	8	8
Severity	Property Damage	3	8	6
	Personal Injury	1	0	2
	Fatality	0	0	0
Time of Day	7:00–9:00 AM	0	2	2
	4:00–6:00 PM	1	1	1
	Other	3	5	5
Day of Week	Mon-Fri	2	8	6
	Sat-Sun	2	0	2
Pavement Conditions	Dry	3	7	6
	Wet	1	1	2
	Ice/Snow	0	0	0
Light Conditions	Daylight	3	7	7
	Dawn or Dusk	0	0	0
	Dark-No lights	0	0	1
	Dark-Lighted	1	1	0
Weather Conditions	Clear	3	7	6
	Foggy/Cloudy	0	1	1
	Rain	1	0	1
	Snow/Sleet	0	0	0
	Other	0	0	0

Based on Hanover Police Department data summarized in Table B-15 and Figure B-8, 20 crashes were recorded at Route 53 and Broadway during a three-year period, 1998 through 2000. Of these, 70% were angle crashes and 25% were rear-end crashes.

This is a signalized intersection, with two lanes on the Route 53 northbound and southbound approaches, and one striped lane on each of the eastbound and westbound approaches. Field observations, however, found that these approaches permitted two lanes of travel, one as an exclusive right-turn lane and one as a shared through/left-turn lane. Sight distances were found to be adequate, and the nearest posted speed limit on Route 53 was 35 mph.

Nearly half (45%) of the crashes involved vehicles turning left onto Broadway from Route 53 and colliding with opposing Route 53 through traffic. It is possible that the turning vehicles were misjudging the gaps available in the opposing traffic stream. There is a protected, leading left-turn phase in the northbound direction, followed by a concurrent northbound/southbound phase. Eastbound/westbound traffic (Broadway) operates on its own concurrent phase.

Figure B-8
Collision Diagram
1/1/98 to 12/31/00
Route 53 @ Broadway (Signalized)
Hanover



SYMBOLS		PAVEMENT/WEATHER/LIGHTING		TYPES OF COLLISIONS	
←	Moving Vehicle	D	Dry	→ ←	Head On
←≈	Backing Vehicle	C	Clear	↙	Angle
- - -	Pedestrian/Bicycle	W	Wet	← ←	Rear End
▨	Parked Vehicle	R	Rain	↙ ←	Sideswipe
✶	Property Damage Only	F	Foggy/Cloudy	↓ ←	Broadside
○	Injury	S	Snowy, Icy		
●	Fatality	O	Other		
□	Fixed Object	DL	Daylight		
↶	Out of Control	N	Dark – No Lights		
(#)	Number of Accidents	L	Dark – Lighted		

CTPS

TABLE B-16
Summary of Local Police Accident Data (1/1/98–12/31/00)
Route 53 at Pleasant Street, Pembroke
(UNSIGNALIZED)

		1998	1999	2000
Collision Type	Rear-End	0	0	1
	Head-On	0	1	1
	Angle	7	4	1
	Other	0	0	0
	Total	7	5	3
Severity	Property Damage	6	5	2
	Personal Injury	1	0	1
	Fatality	0	0	0
Time of Day	7:00–9:00 AM	0	0	1
	4:00–6:00 PM	3	1	1
	Other	4	4	1
Day of Week	Mon–Fri	5	4	3
	Sat–Sun	2	1	0
Pavement Conditions	Dry	3	5	3
	Wet	3	0	0
	Ice/Snow	1	0	0
Light Conditions	Daylight	3	3	3
	Dawn or Dusk	0	0	0
	Dark–No lights	1	0	0
	Dark–Lighted	3	2	0
Weather Conditions	Clear	4	4	2
	Foggy/Cloudy	0	0	0
	Rain	1	0	0
	Snow/Sleet	0	0	0
	Other	2	1	1

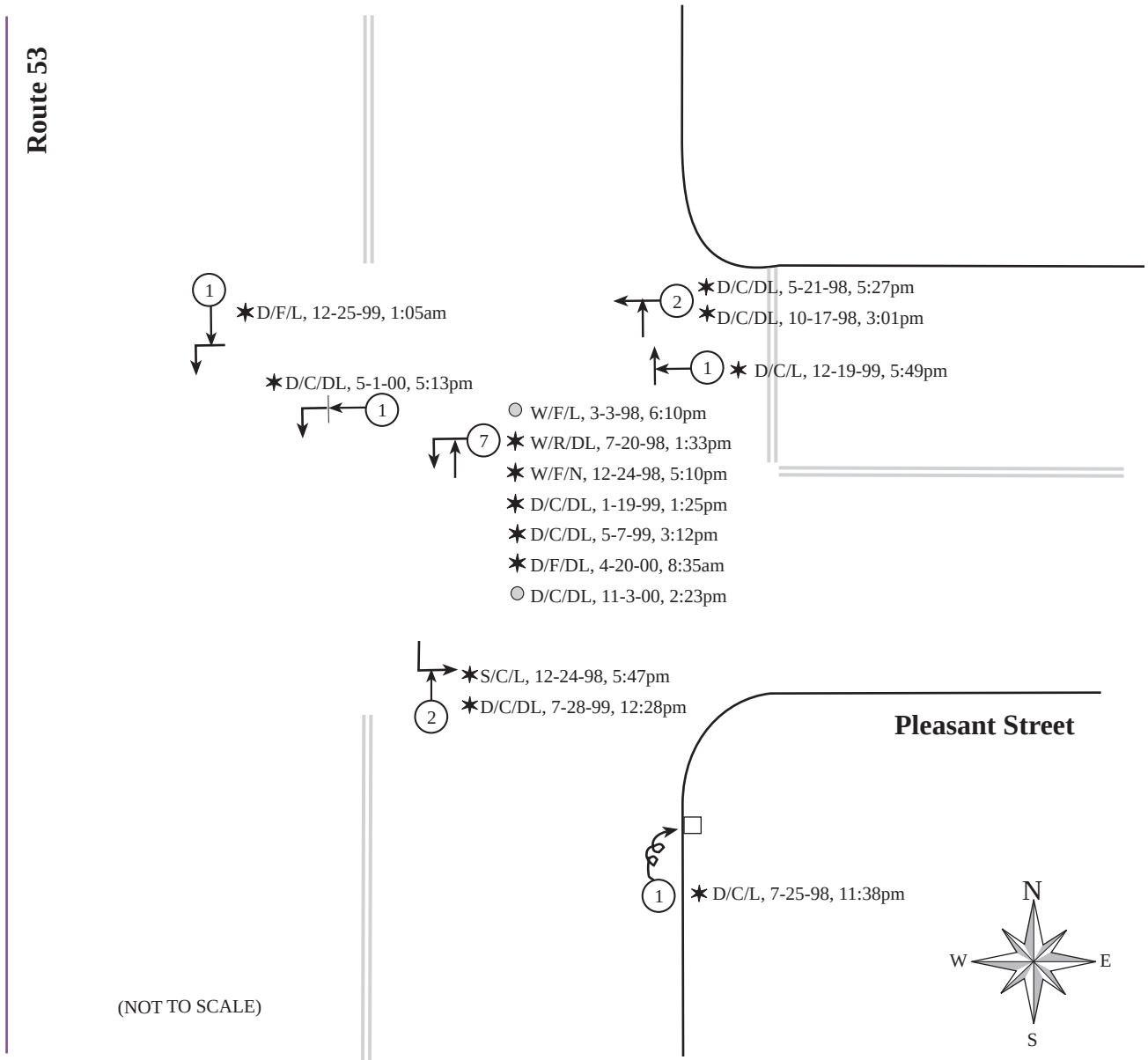
Based on Pembroke Police Department data summarized in Table B-16 and Figure B-9, 15 crashes were recorded at Route 53 and Pleasant Street during a three-year period, 1998 through 2000. Of these, 80% were angle crashes.

This is an unsignalized, three-legged intersection. Route 53 has one travel lane in both directions, while Pleasant Street approaches from the east and has one travel lane in each direction. Right at Route 53, Pleasant Street westbound becomes two lanes, perhaps three cars deep, for exclusive right and left turns.

80% of all crashes involved vehicles exiting Pleasant Street and turning left onto Route 53 southbound. Field observation showed numerous near-misses and hurried and uncertain left-turn maneuvers from Pleasant Street. The posted speed limit on Route 53 is 45 mph, and the high speeds may contribute to the difficulty of turning left from Pleasant Street.

Route 53 southbound vehicles turning left onto Pleasant Street were involved in 13% of all crashes. As these left turns queue and wait for acceptable gaps, southbound through traffic is blocked, perhaps causing turning vehicles to hurry and attempt to use unacceptable gaps in the opposing traffic stream.

Figure B-9
Collision Diagram
1/1/98 to 12/31/00
Route 53 @ Pleasant Street (Unsignalized)
Pembroke



SYMBOLS	PAVEMENT/WEATHER/LIGHTING	TYPES OF COLLISIONS
Moving Vehicle	D Dry	Head On
Backing Vehicle	C Clear	Angle
Pedestrian/Bicycle	W Wet	Rear End
Parked Vehicle	R Rain	Sideswipe
Property Damage Only	F Foggy/Cloudy	Broadside
Injury	S Snowy, Icy	
Fatality	O Other	
Fixed Object	DL Daylight	
Out of Control	N Dark – No Lights	
Number of Accidents	L Dark – Lighted	

CTPS

TABLE B-17
Summary of Local Police Accident Data (1/1/98–12/31/00)
Route 53 at Winter Street, Duxbury
(FLASHING BEACON)

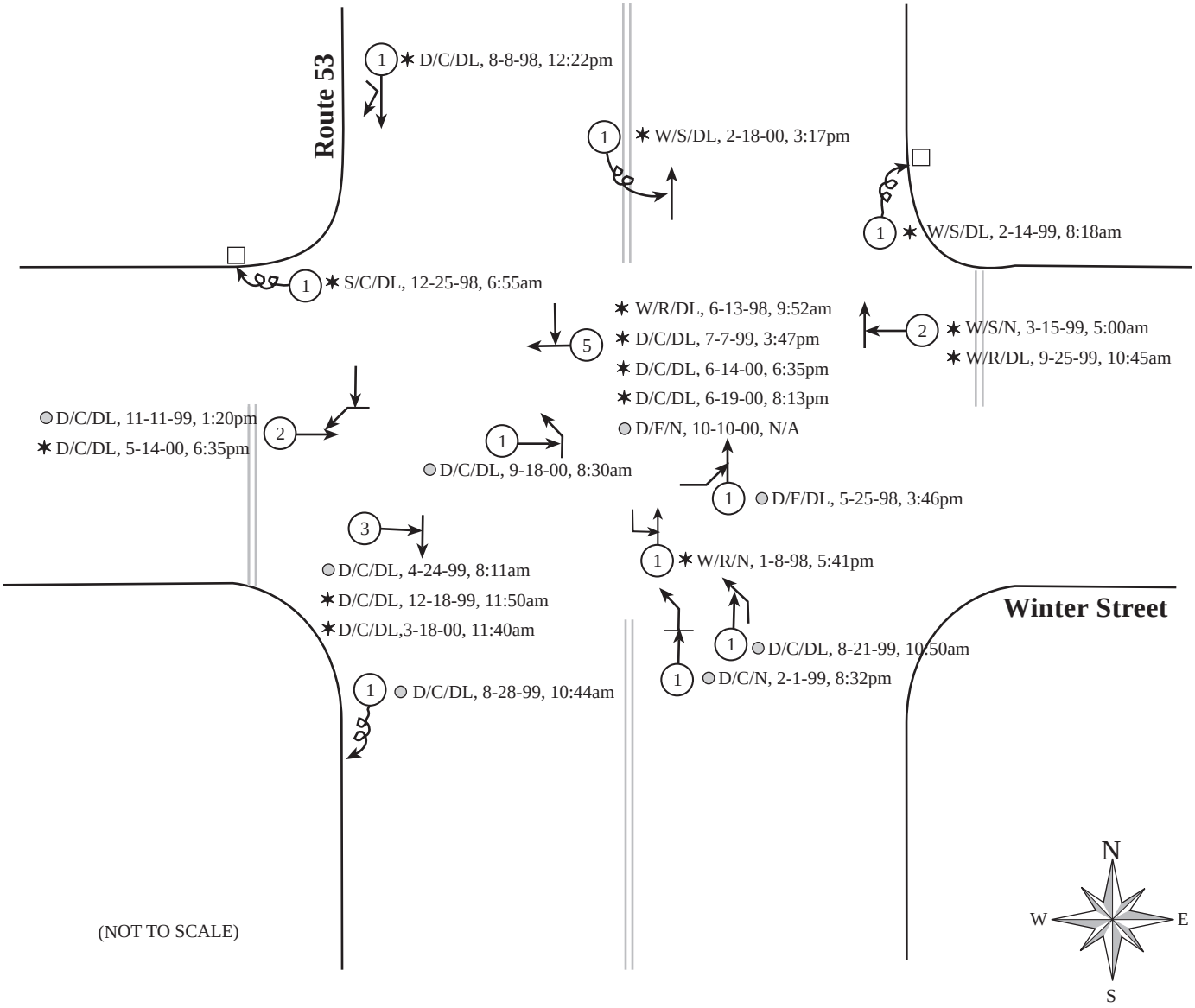
		1998	1999	2000
Collision Type	Rear-End	0	1	0
	Head-On	0	0	0
	Angle	4	7	7
	Other	1	2	0
	Total	5	10	7
Severity	Property Damage	4	5	5
	Personal Injury	1	5	2
	Fatality	0	0	0
Time of Day	7:00–9:00 AM	0	2	1
	4:00–6:00 PM	1	0	0
	Other	4	8	6
Day of Week	Mon-Fri	3	4	5
	Sat-Sun	2	6	2
Pavement Conditions	Dry	2	7	6
	Wet	2	1	0
	Ice/Snow	1	2	1
Light Conditions	Daylight	4	8	6
	Dawn or Dusk	0	0	0
	Dark-No lights	1	2	1
	Dark-Lighted	0	0	0
Weather Conditions	Clear	2	7	5
	Foggy/Cloudy	1	0	1
	Rain	2	1	0
	Snow/Sleet	0	2	1
	Other	0	0	0

Based on Duxbury Police Department data summarized in Table B-17 and Figure B-10, 22 crashes were recorded at Route 53 and Winter Street during a three-year period, 1998 through 2000. Of these, 82% were angle crashes. This is a four-legged intersection with a flashing beacon. The beacon flashes yellow for Route 53 traffic, and red for Winter Street traffic. Overall traffic volumes in this section of Route 53 are among the lowest in the corridor.

However, due to the apparent high speeds (posted limit is 40 mph) and poor sight distance at this intersection, its crash rate is the highest of all intersections monitored in the corridor (see Table B-10 on page 14). Field observation found that, looking to the north from Winter Street, Route 53 crests after approximately 90 m (300 ft), obscuring approaching traffic. To the south, vegetation on the southwest corner and a downgrade on Route 53, with a depression after about 120 m (400 ft), both contribute to the poor sight distance in that direction as well.

Conflicts between Route 53 traffic and vehicles exiting Winter Street were involved in 64% of all crashes. Field observation found that, seen from Route 53, Winter Street “just appears out of nowhere,” despite the warning of the flashing beacon. This finding helps to explain the location’s high crash rate.

Figure B-10
Collision Diagram
1/1/98 to 12/31/00
Route 53 @ Winter Street (Flashing Beacon)
Duxbury



SYMBOLS		PAVEMENT/WEATHER/LIGHTING		TYPES OF COLLISIONS
←	Moving Vehicle	D	Dry	Head On
←≈	Backing Vehicle	C	Clear	Angle
- - -	Pedestrian/Bicycle	W	Wet	Rear End
▭	Parked Vehicle	R	Rain	Sideswipe
✶	Property Damage Only	F	Foggy/Cloudy	Broadside
○	Injury	S	Snowy, Icy	
●	Fatality	O	Other	
□	Fixed Object	DL	Daylight	
↶	Out of Control	N	Dark – No Lights	
(#)	Number of Accidents	L	Dark – Lighted	

CTPS

TABLE B-18
Summary of Local Police Accident Data (4/1/98–3/31/01)
Route 53 at Tar Kiln Road/CVS driveway, Kingston
(UNSIGNALIZED)

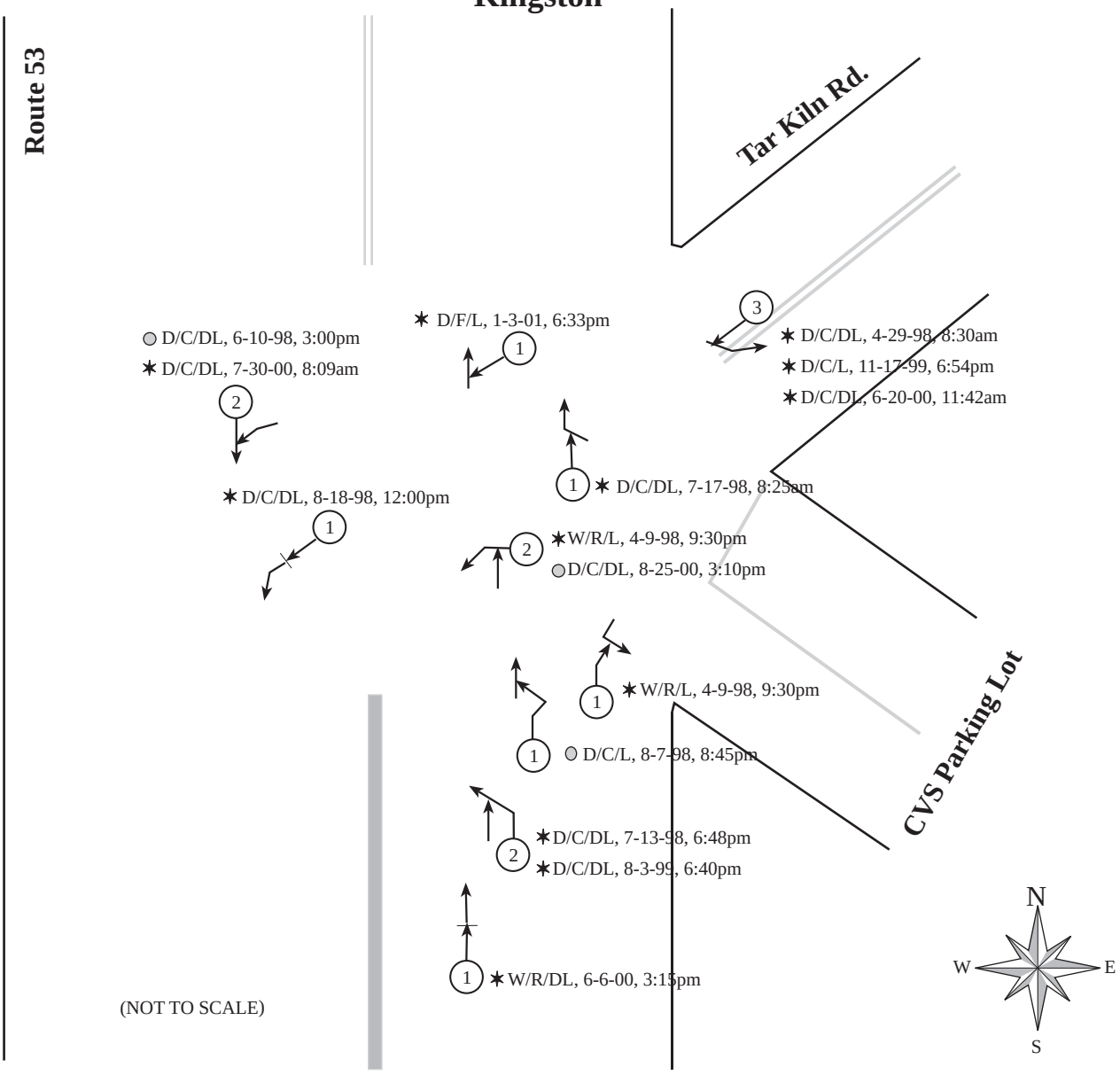
		4/1/98–3/31/99	4/1/99–3/31/00	4/1/00–3/31/01
Collision Type	Rear-End	1	0	1
	Head-On	0	0	0
	Angle	7	2	4
	Other	0	0	0
	Total	8	2	5
Severity	Property Damage	6	2	4
	Personal Injury	2	0	1
	Fatality	0	0	0
Time of Day	7:00–9:00 AM	2	0	1
	4:00–6:00 PM	0	0	0
	Other	6	2	4
Day of Week	Mon-Fri	8	2	4
	Sat-Sun	0	0	1
Pavement Conditions	Dry	6	2	4
	Wet	2	0	1
	Ice/Snow	0	0	0
Light Conditions	Daylight	5	1	4
	Dawn or Dusk	0	0	0
	Dark-No lights	0	0	0
	Dark-Lighted	3	1	1
Weather Conditions	Clear	6	2	3
	Foggy/Cloudy	0	0	1
	Rain	2	0	1
	Snow/Sleet	0	0	0
	Other	0	0	0

Based on Kingston Police Department data summarized in Table B-18 and Figure B-11, 15 crashes were recorded at Route 53 and Tar Kiln Road/CVS driveway during a three-year period, April 1998 through March 2001. Of these, 87% were angle crashes.

This is a location where a side street (Tar Kiln Road) and a commercial driveway (CVS) intersect the northbound side of Route 53. The location is unsignalized, all turns are permitted, and sight distance is relatively good. The speed limit on Route 53 is 40 mph.

Conflicts between Route 53 traffic and vehicles entering or exiting Tar Kiln Road were involved in 47% of all crashes, while 27% were between Route 53 traffic and vehicles entering or exiting the CVS driveway. Another 27% of the crashes involved rear-end or angle incidents on Route 53, apparently due to sudden stopping or lane shifting/merging.

Figure B-11
Collision Diagram
4/1/98 to 3/31/01
Route 53 @ Tar Kiln Road/CVS driveway (Unsignalized)
Kingston



SYMBOLS	PAVEMENT/WEATHER/LIGHTING	TYPES OF COLLISIONS
Moving Vehicle	D Dry	Head On
Backing Vehicle	C Clear	Angle
Pedestrian/Bicycle	W Wet	Rear End
Parked Vehicle	R Rain	Sideswipe
Property Damage Only	F Foggy/Cloudy	Broadside
Injury	S Snowy, Icy	
Fatality	O Other	
Fixed Object	DL Daylight	
Out of Control	N Dark – No Lights	
Number of Accidents	L Dark – Lighted	

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Intersection Level-of-Service (LOS)

Intersection level-of-service analysis was performed for selected intersections in the Route 53 corridor. The analysis was limited to those intersections which were identified by local officials as in particular need of further study. Ten intersections were selected for operational analysis; they are listed in Table B-19.

TABLE B-19
Intersection LOS Analysis, Route 53 Corridor

Town	Route 53 intersection
Quincy	East/West Howard Street (signalized)
Braintree	None
Weymouth	Middle Street (signalized)
	Pleasant Street (signalized)
Hingham	Derby Street/Gardner Street (signalized)
Norwell	None
Hanover	East Street (unsignalized)
	Broadway (signalized)
Pembroke	Pleasant Street (unsignalized)
Duxbury	Winter Street (flashing beacon)
Kingston	Tar Kiln Road (unsignalized)
	Route 3A (signalized)

The LOS results are summarized in Appendix C. The software program HCS2000 (Highway Capacity Software)[2] was used to analyze all the intersections, except Route 53 at Derby Street/ Gardner Street in Hingham. Due to its geometric complexity, this intersection was analyzed using Synchro 5.[3]

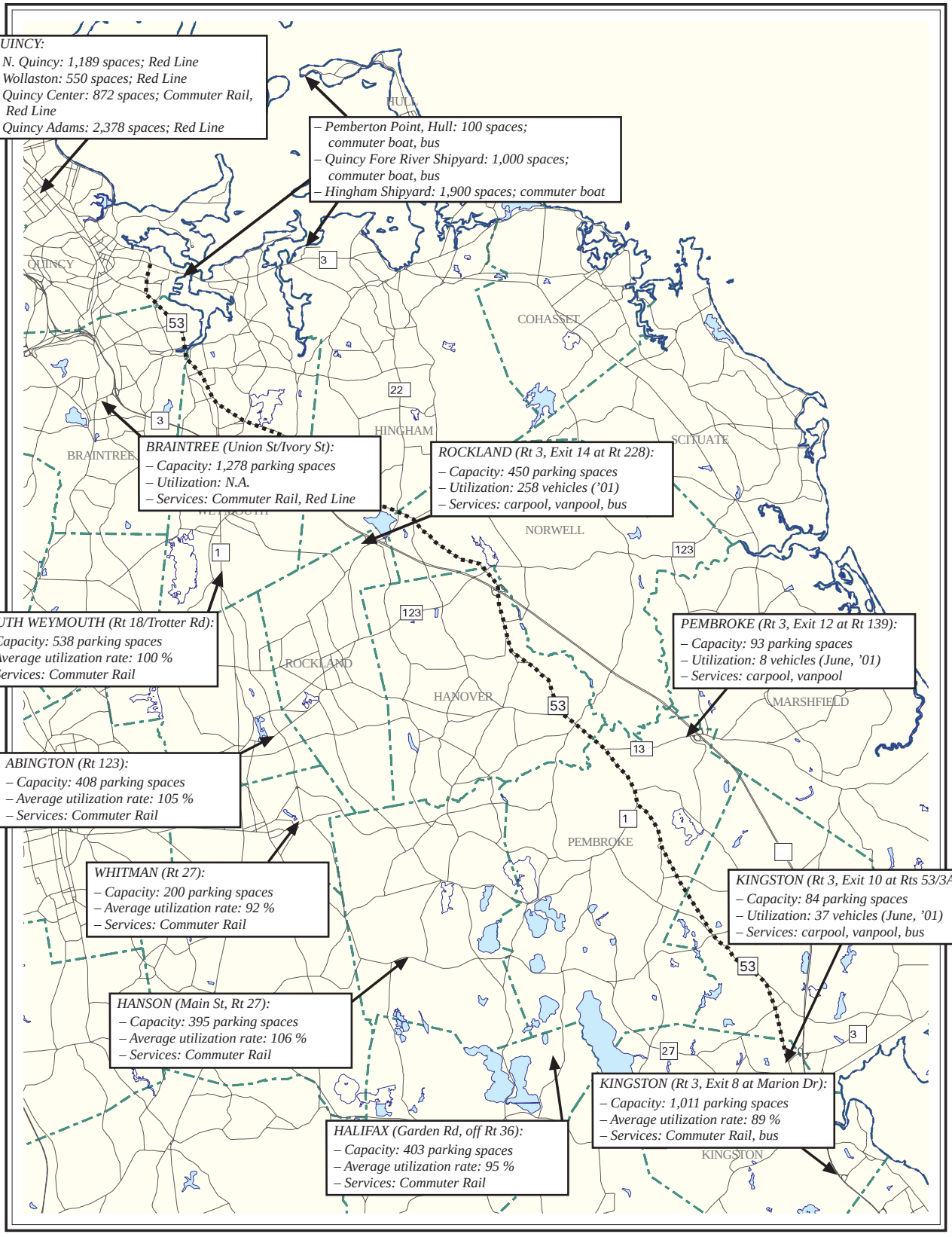
Park-and-Ride Facilities

Numerous facilities exist in the Route 53 corridor and across the South Shore where commuters may park their vehicles and transfer to another mode. These park-and-ride facilities are located at commuter rail stations, rapid transit stations, commuter boat terminals, and key roadway locations such as near highway interchanges and along state-numbered highways. Figure B-12 depicts these facilities, along with available data on capacity and utilization rates.

Travel Time Data

As a key ingredient of its ongoing Congested Management System (CMS) functions, CTPS performs travel time runs on major highways and arterials in the Boston metropolitan region. The runs yield average vehicle speeds for segments of a roadway, as well as for the entire facility. From the average speeds, a relative measure of congestion is obtained on a particular roadway, as well as on its individual segments. Figures B-13 and B-14 show average AM and PM peak

[2] HCS2000 Signalized and Unsignalized Intersections Version 4.1c, McTrans Center, University of Florida, 1994–2000.
[3] Synchro 5, Traffic Signal Coordination Software, Trafficware, 1993–2001.


QUINCY:
– N. Quincy: 1,189 spaces; Red Line
– Wollaston: 550 spaces; Red Line
– Quincy Center: 872 spaces; Commuter Rail, Red Line
– Quincy Adams: 2,378 spaces; Red Line
– Pemberton Point, Hull: 100 spaces; commuter boat, bus
– Quincy Fore River Shipyard: 1,000 spaces; commuter boat, bus
– Hingham Shipyard: 1,900 spaces; commuter boat
BRAINTREE (Union St/Ivory St):
– Capacity: 1,278 parking spaces
– Utilization: N.A.
– Services: Commuter Rail, Red Line
ROCKLAND (Rt 3, Exit 14 at Rt 228):
– Capacity: 450 parking spaces
– Utilization: 258 vehicles ('01)
– Services: carpool, vanpool, bus
SOUTH WEYMOUTH (Rt 18/Trotter Rd):
– Capacity: 538 parking spaces
– Average utilization rate: 100 %
– Services: Commuter Rail
PEMBROKE (Rt 3, Exit 12 at Rt 139):
– Capacity: 93 parking spaces
– Utilization: 8 vehicles (June, '01)
– Services: carpool, vanpool
ABINGTON (Rt 123):
– Capacity: 408 parking spaces
– Average utilization rate: 105 %
– Services: Commuter Rail
WHITMAN (Rt 27):
– Capacity: 200 parking spaces
– Average utilization rate: 92 %
– Services: Commuter Rail
KINGSTON (Rt 3, Exit 10 at Rts 53/3A):
– Capacity: 84 parking spaces
– Utilization: 37 vehicles (June, '01)
– Services: carpool, vanpool, bus
HANSON (Main St, Rt 27):
– Capacity: 395 parking spaces
– Average utilization rate: 106 %
– Services: Commuter Rail
KINGSTON (Rt 3, Exit 8 at Marion Dr):
– Capacity: 1,011 parking spaces
– Average utilization rate: 89 %
– Services: Commuter Rail, bus
HALIFAX (Garden Rd, off Rt 36):
– Capacity: 403 parking spaces
– Average utilization rate: 95 %
– Services: Commuter Rail
HULL
QUINCY
COHASSET
HINGHAM
BRAINTREE
SCITUATE
NORWELL
ROCKLAND
HANOVER
MARSHFIELD
PEMBROKE
KINGSTON
3
53
22
1
123
13
27

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Route 53 Corridor Transportation Plan

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FIGURE B-12
Park-and-Ride Facilities
Route 53 Corridor

FIGURE B –13

AM Peak Period Average Speeds

Route 53 Corridor Transportation Plan

Average Speeds

	Arterial Routes	Freeway (Rte. 3 only)
	1 –9 mph	1 –9 mph
	10 –15 mph	10 –20 mph
	16 –20 mph	21 –30 mph
	21 –25 mph	31 –40 mph
	26 –34 mph	41 –50 mph
	35 + mph	50 + mph

Routes Monitored (Year)

Route 53 (2001)
Route 3 (1998 –99)
Route 3A (1995 –97)
Route 14 (1998 –99)
Route 18 (1998 –99)
Route 123 (1998 –99)
Route 139 (1996 –97)
Route 228 (1998 –99)

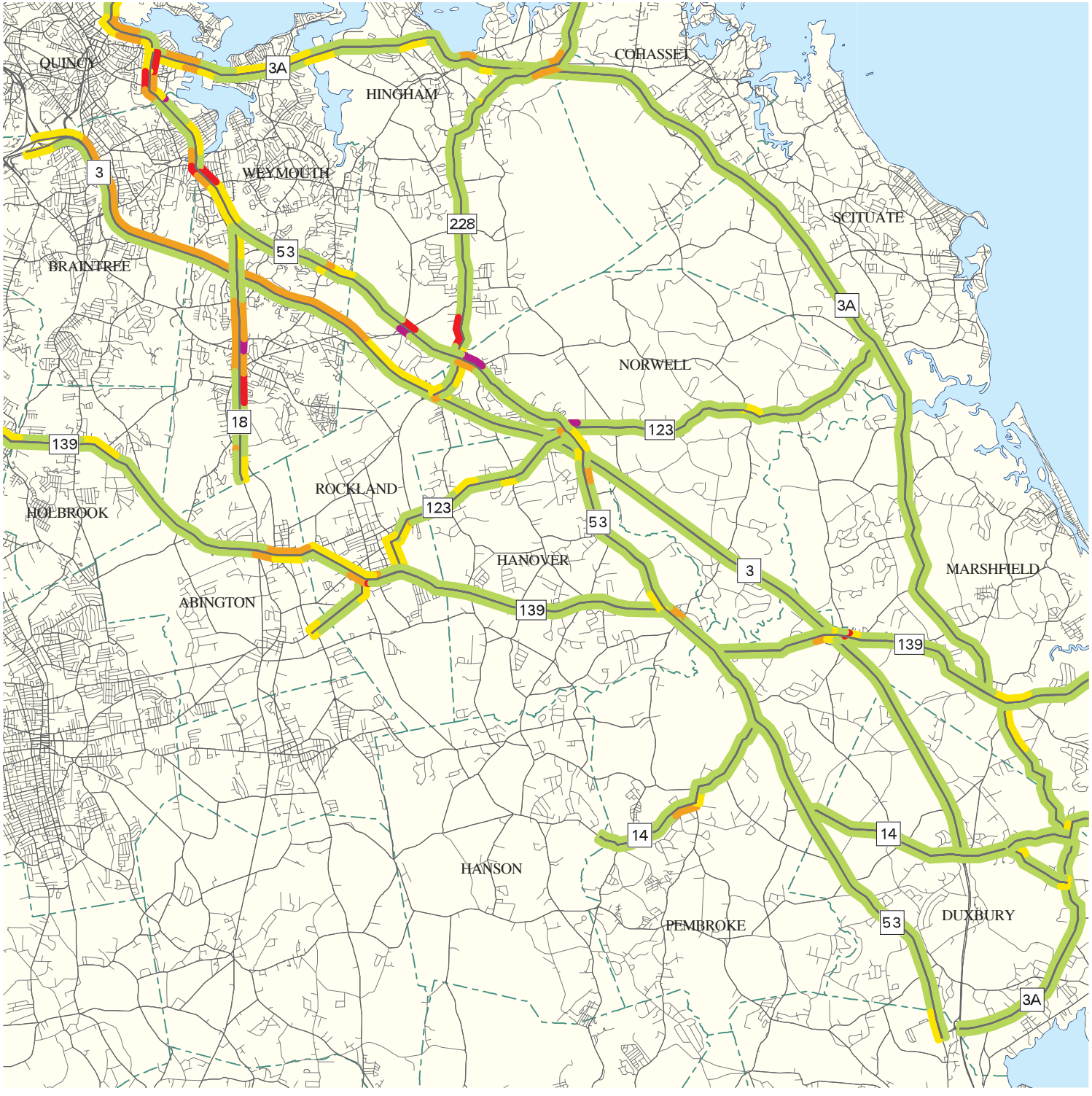


FIGURE B –14

PM Peak Period Average Speeds

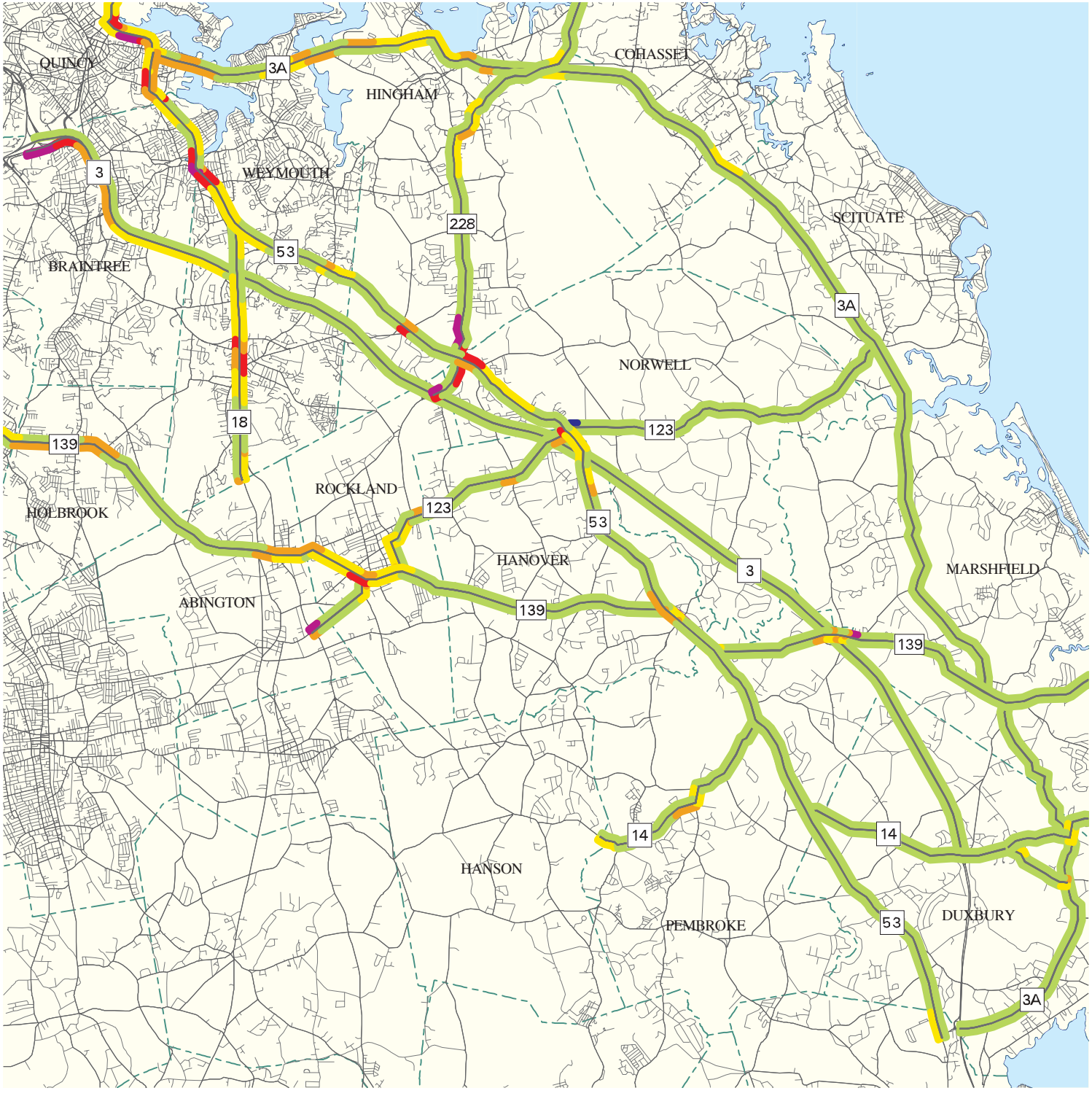
Route 53 Corridor Transportation Plan

Average Speeds

	Arterial Routes	Freeway (Rte. 3 only)
	1 –9 mph	1 –9 mph
	10 –15 mph	10 –20 mph
	16 –20 mph	21 –30 mph
	21 –25 mph	31 –40 mph
	26 –34 mph	41 –50 mph
	35 + mph	50 + mph

Routes Monitored (Year)

Route 53 (2001)
Route 3 (1998 –99)
Route 3A (1995 –97)
Route 14 (1998 –99)
Route 18 (1998 –99)
Route 123 (1998 –99)
Route 139 (1996 –97)
Route 228 (1998 –99)



period speeds for all or parts of seven arterials in the South Shore area: Routes 53, 3A, 14, 18, 123, 139, and 228. Also shown are the average speeds on one limited-access freeway facility, Route 3.

Travel time runs for Route 53 were performed for the entire 35.6 km (22.1 mi) length on two different occasions, in 1996–97 and in 2001. Total average roadway speeds stayed essentially the same for the AM and PM peak periods, northbound as well as southbound, when comparing the two sets of runs (see Table B-20).

TABLE B-20
Comparison of Average Speeds (mph), Route 53 Corridor (1996–1997 and 2001)

	Travel Direction			
	Northbound		Southbound	
Time Period	1996–97	2001	1996–97	2001
AM Peak Period	29.7	32.0	34.5	35.3
PM Peak Period	32.3	31.9	31.0	31.0

Ridesharing

As urban areas become increasingly congested due to growing population levels and numbers of motor vehicles, finding alternatives to single-occupant travelling becomes paramount. Although still modest in comparison to driving alone, one direction in which efforts are being made to create ridesharing opportunities is in the form of vanpools.

CARAVAN for Commuters, Inc., is Massachusetts's statewide ride-matching and transportation information source. It is funded by the Commonwealth of Massachusetts and the Federal Highway Administration.[4] Through CARAVAN's efforts to inform individuals and businesses about ridesharing options, a number of vanpools have been established throughout the South Shore area. Table B-21 lists the ones in operation as of summer, 2002.

TABLE B-21
South Shore Vanpools, CARAVAN, 2002

Origin Town	Intermediate Stops	Destination Town
Kingston	Boston	Chelsea
Marshfield	Hanover	Boston
Plymouth	Kingston, Boston	Cambridge
Rockland	—	Boston
Sagamore	Kingston	Boston
Scituate	Norwell, Hanover	Boston

Source: CARAVAN for Commuters, 2002

[4] CARAVAN for Commuters, Inc., "Commuter Transportation Resource Guide," January 2001.

PUBLIC TRANSPORTATION

Public transportation alternatives to the automobile are available for some commuters in the Route 53 corridor, particularly for those working in or near downtown Boston. A map of the public transportation system south of Boston and throughout the Route 53 corridor and South Shore area is presented in Appendix C (see Figure C-35 on page 79). The extent of service of the individual modes is described in more detail both below and in Appendix C.

Commuter Rail

Up until 1997, there was no commuter rail service between Boston and the South Shore. The three branches of the Old Colony Line had ceased passenger operations in the late 1950s. However, in 1997, two of the branches, Middleborough/Lakeville and Kingston/Plymouth, reopened for service. A third branch, the Greenbush Line through Quincy, Braintree, Weymouth, Hingham, Cohasset, and Scituate, is scheduled to reopen in 2006.

Ridership on the two lines which opened in 1997 has been growing, with many peak period trains at or near capacity. Table B-22 shows estimated ridership between 1998 and 2002 on the commuter rail line closest to the Route 53 corridor, the Kingston/Plymouth Line.

TABLE B-22
Estimated Daily Boardings (Inbound), Kingston/Plymouth Commuter Rail Line, 1998–2002

	May 1998	Feb 1999	Feb 2000	Feb 2001	Feb 2002
Estimated daily boardings (inbound)	3,600	3,600	3,800	3,800	4,700

Source: MBTA, 2002

Table B-23 on the next page shows the towns of origin of vehicles parked at the Kingston/Plymouth Line's seven outlying stations. Noteworthy points from this table include:

- Of the cars parked along the Kingston/Plymouth Line, 34% originate in one of the nine towns abutting Route 53, 9% originate in the other five South Shore Coalition towns (Cohasset, Hull, Marshfield, Rockland, and Scituate), and the remaining 57% originate in other towns.
- Two towns abutting Route 53 (Kingston and Weymouth) have stations on this line (Braintree and Quincy excepted; the Lakeville/Middleborough Line also passes through Braintree and Quincy).
- Of the cars originating in Kingston, more cars parked at Halifax Station (54) than at Kingston Station (46).
- Of the cars parked at Kingston Station, 12 originated in Quincy.

TABLE B-23
Towns of Origin of Cars Parked at Kingston/Plymouth Line Stations, 2002

Towns Abutting Route 53	Station															
	Abington		Halifax		Hanson		Kingston		Plymouth		South Weymouth		Whitman		All Stations	
	No. of cars	% of station	No. of cars	% of station	No. of cars	% of station	No. of cars	% of station	No. of cars	% of station	No. of cars	% of station	No. of cars	% of station	No. of cars	% of all stations
Pembroke	8	3	40	15	98	33	1	0.2	1	20	5	1	3	2	156	8
Weymouth	4	1	2	0.8	1	0.3	4	0.6	0	0	142	38	2	1	155	8
Kingston	2	0.6	54	21	5	2	46	7	1	20	1	0.3	1	0.7	110	5
Duxbury	0	0	29	11	21	7	48	8	0	0	5	1	1	0.7	104	5
Hanover	50	16	1	0.4	5	2	0	0	0	0	18	5	5	3	79	4
Quincy	9	3	1	0.4	6	2	12	2	0	0	10	3	1	0.7	39	2
Norwell	6	2	3	1	0	0	2	0.3	0	0	12	3	1	0.7	24	1
Braintree	3	0.9	2	0.8	1	0.3	1	0.2	0	0	4	1	0	0	11	0.5
Hingham	0	0	0	0	2	0.7	2	0.3	0	0	3	0.8	0	0	7	0.3
Total	82	26	132	51	139	47	116	18	2	40	200	53	14	9	685	34

Note: the column headings "No. of cars" and "% of station" are based on matched vehicles. Overall license plate match rate for all parked vehicles was 77%.
Source: OCPC, 2002

Rapid Transit

The Braintree Branch of the MBTA's Red Line goes through two of the communities in the Route 53 corridor. There are four Red Line stations in Quincy and one in Braintree, the terminal station. Table B-24 shows estimated daily boardings at the five stations.

TABLE B-24
Estimated Daily Boardings, South Shore Red Line Stations, 2002

Station	Boardings
North Quincy	7,600
Wollaston	4,500
Quincy Center	7,200
Quincy Adams	4,600
Braintree	3,800

Source: CTPS, one-day counts May/June, 2002

Bus

Two regional transit authorities operate local bus routes near the northern and southern ends of the Route 53 corridor and South Shore area. In the north, except for Quincy, which has extensive local bus service, the Massachusetts Bay Transportation Authority (MBTA) operates eight routes through parts of Braintree, Weymouth, Hingham, and Hull. In the extreme south of the study area, the Greater

Attleborough Taunton Regional Transit Authority (GATRA) operates three bus routes in Kingston through its Plymouth Area Link (PAL). Between the MBTA and GATRA/PAL service areas, two private bus operators have established routes through some South Shore communities. The Plymouth and Brockton Street Railway Co. (P&B) operates limited AM and PM peak period bus service on three routes between downtown Boston and Braintree, Rockland, Scituate, Marshfield, Duxbury, and Kingston. P&B also operates a feeder route between Marshfield and the Braintree Red Line station via the Hanover Mall. JBL Bus Lines operates two peak period bus trips between Boston and Braintree, Weymouth, Abington, and Whitman. JBL also operates a local commuter shuttle between the Braintree Red Line station and Weymouth (see Figure C-35 in Appendix C).

Commuter Boat

Two commuter boat routes service the northernmost communities of the Route 53 corridor and South Shore area. The Hingham route runs from the Hingham Shipyard to Rowes Wharf in Boston. There are no intermediate stops on this route. The second route is more circuitous, running between Hull, Quincy, Logan Airport, and Long Wharf in Boston.

Approximate daily boardings and passengers' towns of origin for the two routes are shown in Table B-25.

TABLE B-25
Estimated Daily Boardings, Town of Origin of Passengers
South Shore–Boston Commuter Boat Routes

Route	Daily Boardings	Town of Origin
Hingham–Boston	1,900	Hingham, 35% Scituate, 20% Cohasset, 14% Weymouth, 10% Hull, 9% Marshfield, 6% Norwell, 3% (others, less than 1% each)
Hull/Quincy–Boston	100 (Hull) 500 (Quincy)	Hull, 99% Scituate, 1% N.A.

Sources: CTPS, MBTA Water Transportation Survey, 2000 Passenger Survey, March 2001; *Patriot Ledger*, July 12, 2001, and December 28, 2001

PEDESTRIANS AND BICYCLES

Pedestrians

Route 53 is a typical radial transportation corridor in terms of pedestrian facilities. Of the 35.6 km (22.1 mi) in the corridor, there are sidewalks on at least one side over a total distance of 15.6 km (9.7 mi), or 44%. However, virtually all of the sidewalks are in the more densely developed communities close to Boston. Quincy, Braintree, Weymouth, Hingham, and Norwell constitute the northernmost 15.9 km (9.9 mi) of the corridor, and 13.8 km (8.6 mi), or 87%, of this stretch has sidewalks on one or both sides.

Understandably, the more rural and less populated the community, the less likely it is to have sidewalks along the roadway. A summary of sidewalk lengths by community on Route 53 is shown, in Appendix C, in the table on page 86, and in Figure C-36 on page 87.

Additionally, many of the major signalized intersections in the corridor have crosswalks and pedestrian buttons on the signal posts. The intersections vary as to whether or not a pedestrian phase exists. Two exclusive pedestrian signals exist in the corridor: one north of Bickford Road in Braintree, in the vicinity of American Prosthetics/Joan's Olympic Gym, the other north of Knollwood Road in Norwell, near a church. No pedestrian bridges cross Route 53.

With respect to pedestrian accidents in the Route 53 corridor, the Massachusetts Registry of Motor Vehicles (RMV) data indicate which motor vehicle crashes involve pedestrians. The data are not accurate enough to determine the precise locations of most crashes; however, for the entire corridor, there were 30 vehicle crashes in the nine abutting communities involving one or more pedestrians during the three-year period 1996–98. Most crashes with pedestrians resulted in personal injury, and there was one fatality.

Bicycles

Although Route 53 has a varying 0–2.5 m (0–8 ft)-wide striped shoulder on both sides for much of its length, dedicated bicycle paths along Route 53 or on the South Shore are essentially nonexistent. However, approximately 2 km (3 mi) of the Claire Saltonstall Bike Route does run through southwestern Kingston. This is a 220 km (135 mi) on-road bicycle route between Boston and Cape Cod. The Kingston piece enters from Plympton on Elm Street, turns right onto Bishop's Highway (Route 80), and continues into Plymouth (see Figure C-37 on page 91 in Appendix C).

There have been recent attempts to turn an abandoned section of the old Hanover branch of the Old Colony Railroad into a dedicated bicycle/pedestrian trail. This is a 16 km (10 mi) section, which may conceivably become part of a greater "Walk to the Sea" system between Pembroke and Marshfield, or through Norwell and Scituate.

The RMV data show a total of 15 vehicle crashes on Route 53 involving a bicycle during 1996–98. All involved just one vehicle, and most resulted in personal injury. No fatalities were recorded.

APPENDIX C

The Route 53 Corridor Transportation Plan: Recommended Improvements (and Improvements Already Planned)

INTRODUCTION[1]

Appendix C describes the elements of the Route 53 Corridor Transportation Plan: recommended transportation improvements within and near the Route 53 corridor.

The elements of the plan are a set of conceptual transportation improvements developed by CTPS. The improvements are based partly on transportation concerns in the corridor as conveyed to CTPS by local officials in the nine communities abutting Route 53. Transportation concerns were also identified by CTPS through field work and reconnaissance. However, because of the constraints of the budget authorized, only the most pressing concerns have been analyzed.

For the sake of completeness, also described in this plan are transportation improvements in the corridor planned by other agencies or town planning departments. Included in this group are all known development-related mitigation plans in the Route 53 corridor, and publicly funded transportation improvements described in the most recent Transportation Improvement Program (TIP).[2] Figure C-1 shows the location of all transportation improvements in the 35.6 km (22.1 mi)-long Route 53 corridor, including both those developed by CTPS and those previously developed as mitigation or as part of the TIP. [Figure C-1 provides the page number of the discussion of each improvement in Appendix C.]

The plan is broken down into the following four categories. They are shown as the four major headings in the remainder of this appendix:

- *Route 53 Intersections and Segments between Intersections*. Included are:
  - Location of improvements
  - Description of improvements
  - Assessment of improvements
  - Time frame of improvements (short-range vs. long-range)[3]
  - Jurisdiction over improvements
- *Public Transportation Services*
- *Pedestrians and Bicyclists*
- *Transportation Improvements Outside the Route 53 Corridor*

ROUTE 53 INTERSECTIONS AND SEGMENTS BETWEEN INTERSECTIONS

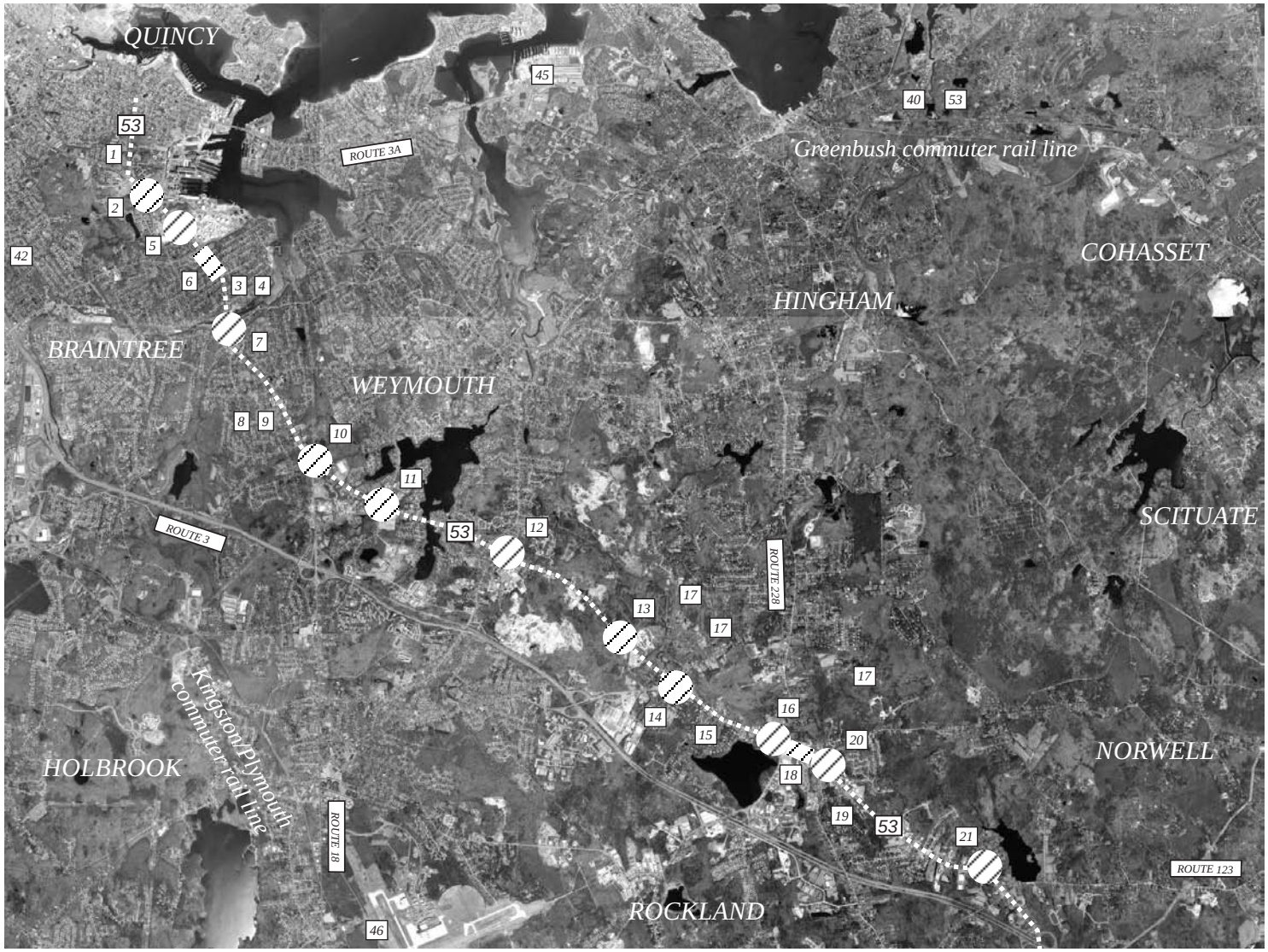
Transportation improvements at Route 53 intersections and on segments of Route 53 between intersections are presented below from north to south, Quincy through Kingston. For those intersections where improvements are recommended by CTPS and for which operational level of

---

[1] Appendix C is a revision of two combined memoranda which were distributed to the Route 53 Corridor Transportation Plan Advisory Group, entitled "Task 4: Review of Development-Related Mitigation and Publicly Funded Transportation Improvements in the Route 53 Corridor," December 31, 2002, and "Task 5, The Route 53 Corridor Transportation Plan: Recommended Improvements," September 3, 2003.

[2] Boston Metropolitan Planning Organization (MPO), "Transportation Improvement Program and Air Quality Conformity Determination, Fiscal Years 2004–2008," September 11, 2003.

[3] A general estimate of improvements being implemented in less than five years (short-range) versus more than five years (long-range). Available funding is not a limiting factor.



Transportation improvements on Route 53 by location, northern half, with page number of discussion in Appendix C

- 1 3 8 15 19 Along Rt 53, pp. 4, 9, 13, 29, 37
- 2 At East/West Howard St, Quincy, p. 4
- 4 Along Rt 53, Braintree, p. 9
- 5 At Dunkin' Donuts/Viking Club, Braintree, p. 11
- 6 Between Bickford Rd and Hayward St, Braintree, p. 12
- 7 Weymouth Landing area, p. 13
- 9 Along Rt 53, Weymouth, p. 15
- 10 At Rt 18, Weymouth, p. 15
- 11 At Middle St, Weymouth, p. 18
- 12 At Pleasant St, Weymouth, p. 20
- 13 West of Old Ward St, Hingham, p. 23
- 14 At Derby St/Gardner St, Hingham, p. 26
- 16 At Queen Anne's Corner, Hingham/Norwell, p. 30
- 17 Near Queen Anne's Corner, Hingham/Norwell, p. 33
- 18 Between Queen Anne's Corner and Grove St/High St, Norwell, p. 35
- 20 At Grove St/High St, Norwell, p. 37
- 21 At Jacob's Trail, Norwell, p. 39
- 40 Greenbush Line, p. 81
- 42 Red Line, p. 82
- 45 Hingham Shipyard, p. 84
- 46 Former South Weymouth Naval Air Station, p. 84
- 53 Greenbush Line, p. 89

CTPS

Route 53 Corridor Transportation Plan

KEY

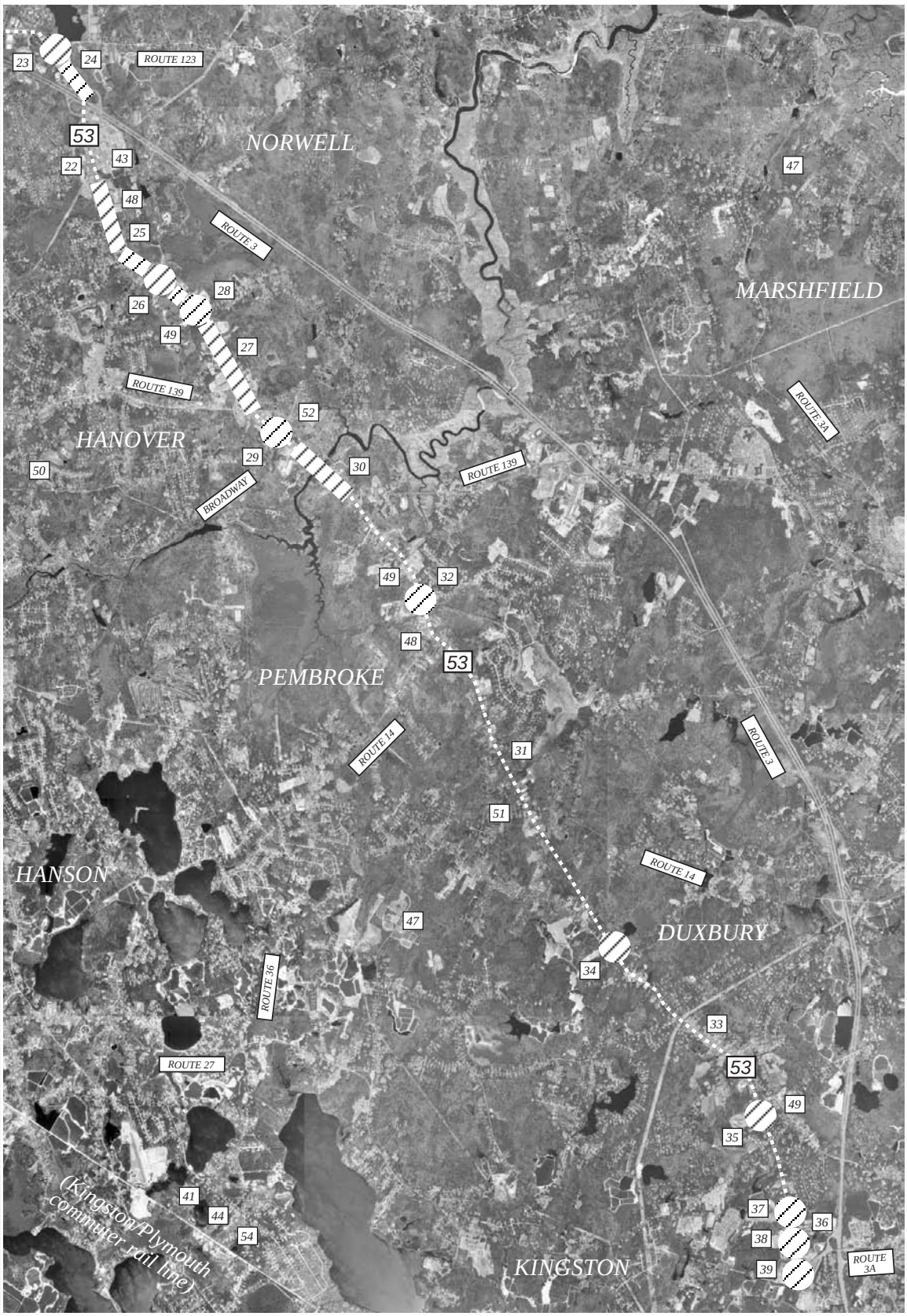
Route 53 intersection

Route 53 segment

N

Aerial photo source: MassGIS and MIT

FIGURE C-1a
Northern Portion of Study Area: Locations with Recommended or Already-Planned Transportation Improvements



Transportation improvements on Route 53 by location, southern half, with page number of discussion in Appendix C

- 22 31 33 36 Along Rt 53, pp. 41, 60, 66, 71
- 23 At Rt 123, Hanover, p. 43
- 24 Between Rt 123 and Rt 3, Hanover, p. 45
- 25 Between Mill St and Rawson Rd, Hanover, p. 48
- 26 At Old Washington St, Hanover, p. 50
- 27 Between Rawson Rd and Rt 139, Hanover, p. 52
- 28 At East St, Hanover, p. 54
- 29 At Broadway, Hanover, p. 56
- 30 Between Broadway, Hanover, and Rt 139, Pembroke, p. 59
- 32 At Pleasant St, Pembroke, p. 63
- 34 At High St, Duxbury, p. 66
- 35 At Winter St, Duxbury, p. 66
- 37 At Silver Birch Lane, Kingston, p. 71
- 38 At Tar Kiln Rd/CVS, Kingston, p. 73
- 39 At Rt 3A, Kingston, p. 76
- 41 Commuter rail, p. 81
- 43 Between Red Line and Hanover Mall, p. 82
- 44 Feeder buses, p. 83
- 47 Ridesharing, p. 85
- 48 Sidewalks, p. 85
- 49 Pedestrian improvements, p. 86
- 50 Pedestrian/bicycle trail, p. 86
- 51 Bicycle improvements, p. 89
- 52 Bicycle loop detectors, signs, and markings, p. 89
- 54 Bicycle parking, p. 89

CTPS

Route 53 Corridor Transportation Plan

KEY
- Route 53 intersection
- Route 53 segment

N

Aerial photo source: MassGIS and MIT

FIGURE C-1b
Southern Portion of Study Area: Locations with Recommended or Already-Planned Transportation Improvements

service (LOS) assessments were performed, both existing intersection turning movement counts (2000) and projected turning volumes for the years 2005 and 2025 were used. Appendix C-1 discusses the assumptions and sources used in developing the future-year volumes.

Where improvements were planned by others, there was usually an accompanying traffic report which described the essential information and often included LOS analyses, crash data, queuing data, and probable time frames for implementation. For these cases, the specific base years and target years used in the respective reports are reported in this plan, rather than the years 2000, 2005, and 2025.

Quincy

Route 53 in southeast Quincy runs 1.4 km (0.9 mi) from Route 3A (Washington Street) to the Braintree line. The roadway has six signalized intersections and is alternatively called Southern Artery and Quincy Avenue. The Southern Artery portion, which has both two- and three-lane cross sections, is 1 km (0.65 mi) long and is under local jurisdiction. The 0.4 km (0.25 mi) Quincy Avenue section is also under local jurisdiction and has four travel lanes. Abutting land use is residential and commercial (see Figure C-2).

1 ***Route 53 in Quincy:*** *Only 0–0.3* m *(0–1 ft)-wide striped shoulders exist on Route 53 in Quincy.*

Recommended improvement: *Restripe the lane markings on Route 53 so that, wherever possible, or when future reconstruction of Route 53 occurs, a 2.5 m (8 ft)-wide shoulder would be added to both sides of the roadway.*

This is a short-range improvement which falls under the jurisdiction of the City of Quincy.

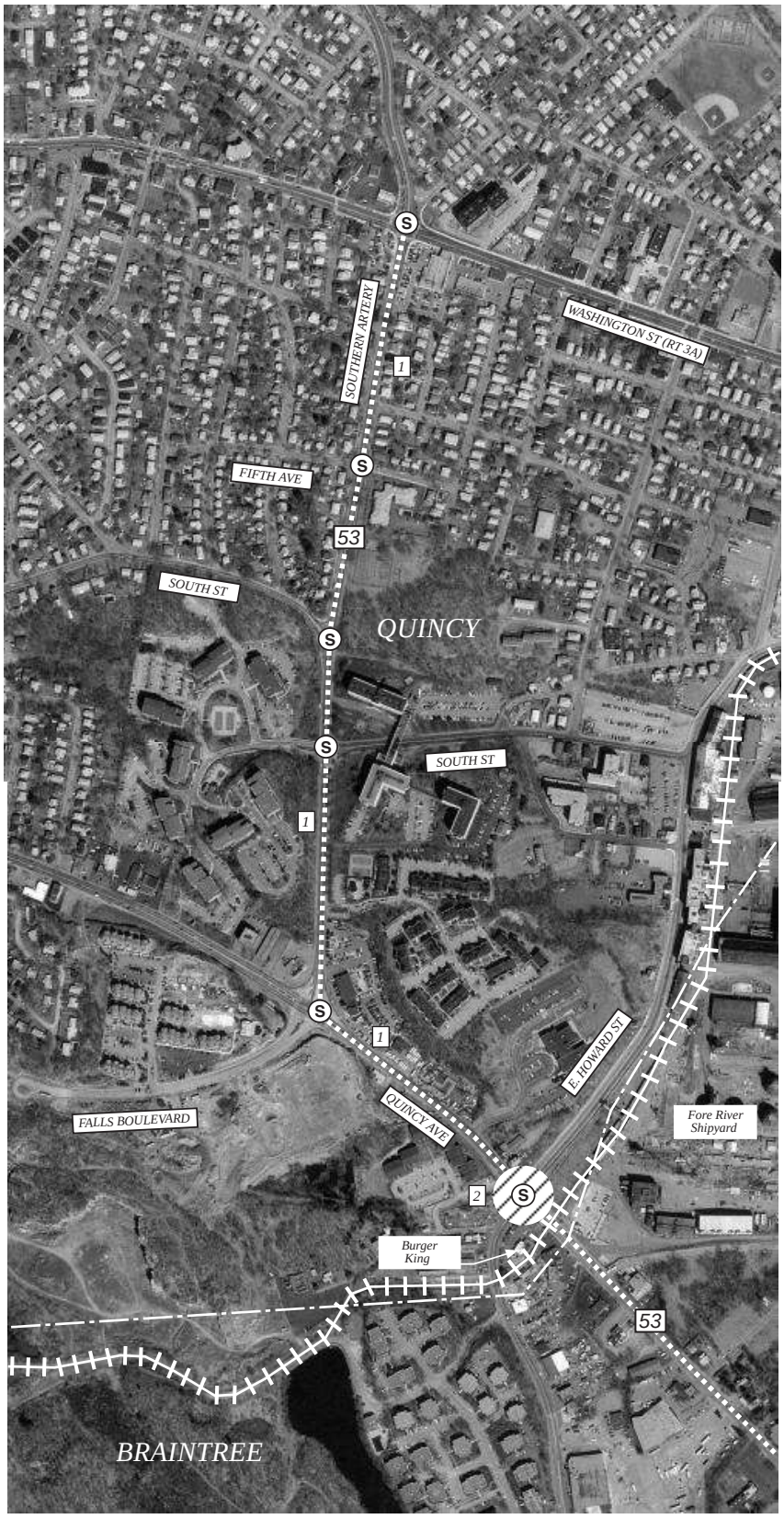
Assessment: To increase overall safety, as well as to provide space for the operation of emergency vehicles, the Massachusetts Highway Department (MassHighway) Highway Design Manual recommends a minimum width of 2.5 m (just over 8 ft) for shoulders on roadways that are classified as Urban Arterials.[4] Route 53 is classified as an Other Urban Principal Arterial in Quincy. There is a minimum of about 18 m (60 ft) of highway layout right-of-way on Route 53. It therefore appears possible to restripe the travel lanes in order to add wider shoulders along the roadway between Washington Street (Route 3A) and the Braintree line, while retaining four 3.75 m (12 ft)-wide travel lanes in both directions.

2 ***Route 53 at East/West Howard Street:*** *There are vehicle crashes and poor operational conditions at the intersection of Route 53 with East/West Howard Street.*

Some factors that possibly contribute to these conditions include:

- The East Howard Street and West Howard Street approaches are offset, reducing sight lines and creating some confusion for drivers.

[4] The Commonwealth of Massachusetts, "Highway Design Manual," Metric Edition, 1997, Table 5.1, p. 5.02.0.



LOCATIONS OF TRANSPORTATION IMPROVEMENTS:

[1] Wherever possible, add striped 2.5 m (8 ft) shoulders on both sides of the length of Route 53 in Quincy. Only 0–0.3 m (0–1 ft) striped shoulders currently exist (refer to p. 4).

[2] Widen the intersection of Quincy Ave at East/West Howard St (refer to p. 4 and Figure C-3)

Northern terminus of Route 53 (Southern Artery at Washington St, Route 3A intersection)

Fore River Railroad (freight only; East Braintree–Fore River Shipyard)

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Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE C-2
Quincy: Route 53 Layout and Locations of Transportation Improvements

- 33 vehicle crashes were recorded by Quincy police between January 1999 and August 2001, an average of 12.4 crashes per year (see Table B-11 and Figure B-4 in Appendix B). The intersection crash rate was 1.02 crashes per million entering vehicles. This is higher than the MassHighway District 4 average of 0.87.
- Due to high peak-period volumes and capacity limitations, the intersection experiences high levels of total vehicle delay and estimated queues.

Numerous conceptual design improvements were considered by CTPS. Three alternatives were analyzed for operational LOS. These are depicted in Figure C-3, and include one or more of the following components: the addition of exclusive left-turn lanes on East/West Howard Street (Alternative 1); the addition of exclusive left-turn lanes on East/West Howard Street and widening of West Howard Street with the addition of two receiving lanes (Alternative 2); and the widening of both Howard Street approaches to two general purpose lanes (Alternative 3). The recommended improvements, selected as a result of the overall analysis, are discussed below.

Recommended improvements:

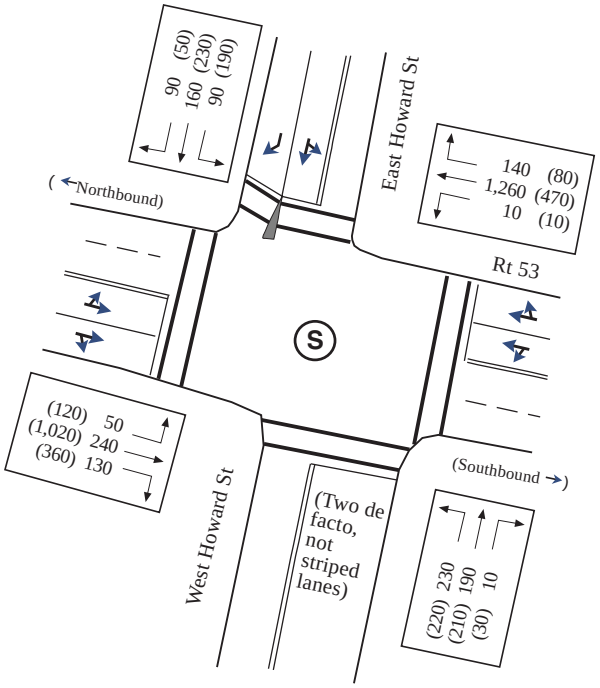
- *Realign the intersection so that East Howard Street is directly opposite West Howard Street.*
- *Build Alternative 1: Add exclusive left-turn lanes to the East/West Howard Street approaches.*
- *Consider adding movable gates at the single-track railroad crossing 30 m (100 ft) to the south and west of the intersection.*
- *Add loop detectors, signs, and markings for bicyclists.*

These are all long-range improvements, and fall under the City of Quincy's jurisdiction. The owners of the railroad would be involved in any potential improvements at the railroad crossings.

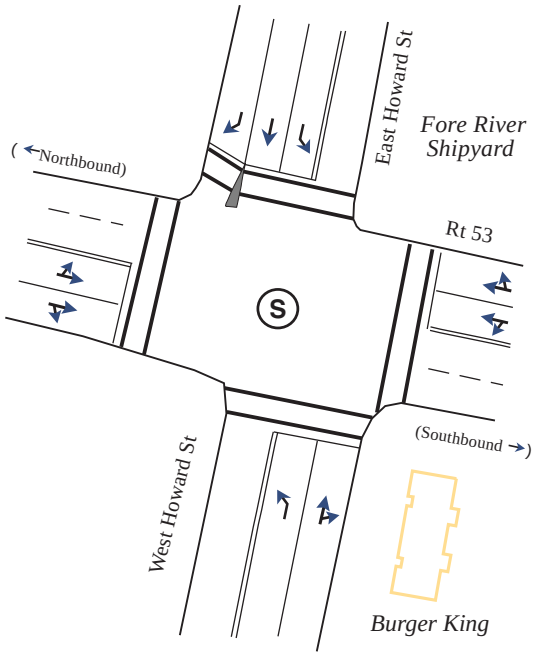
Assessment: Realigning the East/West Howard Street approaches would improve traffic operations as well as overall sight lines. This would require the taking of land extending about 75 m (250 ft) from the Fore River Shipyard along East Howard Street to the intersection. This would be done in order to straighten the intersection alignment and to create the necessary travel lanes.

Widening of the East/West Howard Street approaches to an official three-lane cross section eastbound, and a four-lane cross section westbound, will increase capacity and improve the throughput of peak-hour traffic. It is acknowledged that even with the improvements, the intersection would fail if the current exclusive pedestrian phase were to remain. The summary table on page 8 shows that in virtually every scenario the intersection fails when an exclusive pedestrian phase is included. Therefore, it is recommended that for Build Alternative 1 the pedestrian phase be changed to concurrent with the respective north/south and east/west signal phases. Although the intersection LOS would still be F in the 2025 PM peak hour, this alternative would be less invasive than Build Alternatives 2 and 3.

It is expected that the improvements would yield a reduction in queued vehicles at the intersection as well as in the number of vehicle crashes. From the Quincy police data, angle crashes made up 58% of all crashes, and the recommended eastbound leading signal phase would more safely accommodate the high proportion of left turns from West Howard Street during the AM peak hour.

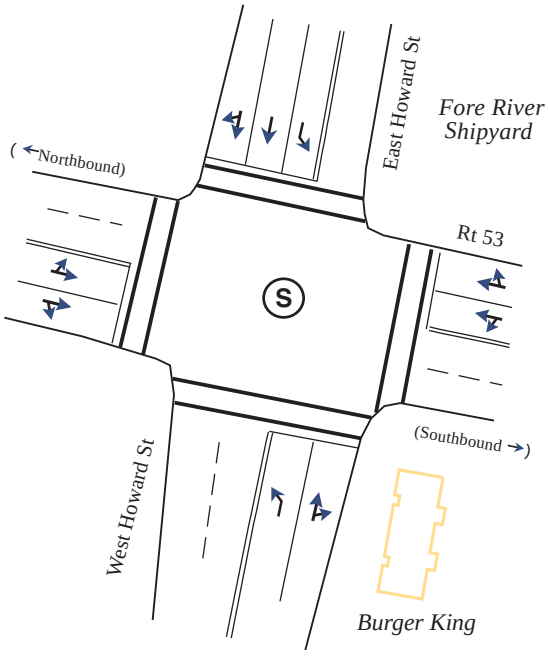


Existing intersection layout and AM (PM) peak hour turning movement volumes

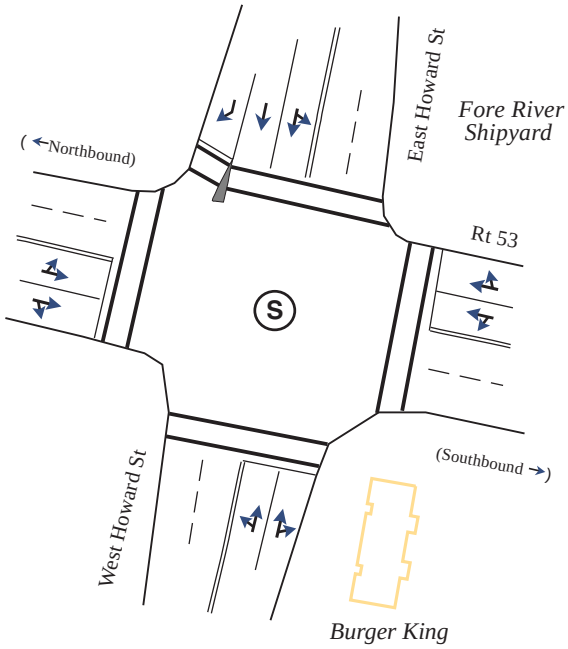


Alternative 1: Exclusive left-turn lanes on East/West Howard St

Alternative 2: Exclusive left-turn lanes on East/West Howard St; two receiving lanes on West Howard St



Alternative 3: Two general-purpose lanes on East/West Howard St



(Not to scale)

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FIGURE C-3
Route 53 at East/West Howard Street (Quincy): Intersection Improvement Alternatives Analyzed

The Fore River Shipyard, located in the southeast quadrant of the intersection, was recently sold and is expected to be redeveloped in the next few years. It is therefore possible that traffic patterns may change and overall traffic levels may increase in the surrounding area, including at the intersection of Route 53 and East/West Howard Street. Any improvements recommended in this plan for this intersection, and ultimately adopted by the City of Quincy, could possibly be combined with mitigation for shipyard redevelopment.

The single-track Fore River Railroad, which runs between East Braintree and the Fore River Shipyard, crosses Route 53 and West Howard Street about 30 m (100 ft) south and west of the East/West Howard Street intersection, respectively (see Figure C-2). Currently, there are flashing lights on overhead masts at both locations that warn drivers of oncoming trains (freight traffic only; operating at very slow speeds). The installation of preemption equipment in the pavement would enable vehicles on or near the tracks to receive enough green time in order to clear the tracks and proceed through the intersection. This measure is recommended, not only as a safety improvement, but also from a liability standpoint. Due to legal precedent elsewhere in the U.S., the city and/or the railroad could potentially be held liable in case of crashes involving vehicles and trains crossing Route 53 or West Howard Street.[5]

Route 53 at East/West Howard Street Intersection Summary:

- Intersection LOS data *(recommended improvement, Build Alternative 1, Concurrent Pedestrian Phase)*:

	AM Peak Hour			PM Peak Hour		
Scenario	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)
2000 Existing	F	*	111	F	*	>160
2005 No-Build	F	*	118	F	*	>160
Build Alt. 1	E	66	84	F	*	124
Concurrent Phase	D	38	55	E	78	85
Build Alt. 2	E	63	76	F	*	110
Build Alt. 3	D	49	70	E	67	94
2025 No-Build	F	*	149	F	*	>160
Build Alt. 1	F	*	103	F	*	150
Concurrent Phase	D	48	72	F	*	100
Build Alt. 2	F	*	94	F	*	134
Build Alt. 3	E	65	87	F	*	119

- Number of vehicle crashes, 1999–Aug. 2001 (Quincy police): 33 (12.4 per year)
- Crash rate: 1.02 crashes per million entering vehicles (District 4 average: 0.87)
- Jurisdiction over improvements: City of Quincy, Fore River Railroad

* = 80 or more seconds total delay for signalized intersections, 50 or more seconds for unsignalized intersections.
Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

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[5] See The Urban Transportation Monitor, "Transportation Tort Liability: Case in Review, Application of Preemption at Highway-Rail Crossing at Issue," November 29, 2002, p. 7.

Braintree

In northeast Braintree, Route 53 (Quincy Avenue) is a four-lane, undivided roadway, which spans a distance of 2.3 km (1.4 mi) from the Quincy line to the Weymouth line. There are four signalized intersections and one signalized pedestrian crossing in the segment. Land use is primarily industrial and commercial in the segment's northern half, while the southern half is mostly residential (see Figure C-4).

3 ***Route 53 in Braintree:*** *No striped shoulders exist on Route 53 in Braintree.*

Recommended improvement: *Restripe the lane markings on Route 53 so that, wherever possible, or when future reconstruction of Route 53 occurs, a 2.5 m (8 ft)-wide shoulder is added to both sides of the roadway.*

This is a short-range improvement, falling under the jurisdiction of MassHighway.

Assessment: To increase overall safety, as well as to provide space for emergency vehicle operations, MassHighway's Highway Design Manual recommends a minimum of 2.5 m (just over 8 ft)-wide shoulders on roadways classified as Urban Arterials.[6] Route 53 is classified as an Other Urban Principal Arterial in Braintree. There is a minimum of about 18 m (60 ft) of highway layout right-of-way on Route 53. It appears possible to restripe the travel lanes in order to add wider shoulders along most of the roadway in Braintree while retaining two 3.75 m (12 ft)-wide travel lanes in each direction.

4 ***Route 53 in Braintree:*** *Sidewalks, driveways, and curb cuts have deteriorated and have become ill-defined at some locations on Route 53.*

Recommended improvement: *As part of any future reconstruction of Route 53, upgrade and widen the sidewalks on both sides of the roadway to 2 m (6 ft). Consolidate curb cuts to commercial properties, if possible, while making entry and exit driveways more defined.*

These upgrades would be long-range improvements. MassHighway and the Town of Braintree have jurisdiction.

Assessment: In some cases, curb cuts at commercial establishments have, over time, become as wide as the entire property. As a result, the sidewalk and the curb cut are now one entity. MassHighway's Highway Design Manual recommends a sidewalk width of 2 m (6 ft). Regarding minimum widths, "a 1.0 meter minimum clearance must be maintained for wheelchairs with sufficient 1.6 meter zones for passing as required by the Americans with Disability Act (ADA)."[7] Also, "a minimum 1.0 meter wide wheelchair path of no more than 2% cross slope must be provided where a driveway crosses a sidewalk."[8]

[6] The Commonwealth of Massachusetts, op. cit., p. 5.02.0.
[7] Ibid., p. 5.08.0.
[8] Ibid., p. 7.67.0.

LOCATIONS OF TRANSPORTATION IMPROVEMENTS:

3 Wherever possible, add a striped 2.5 m (8 ft) shoulder on both sides of the length of Route 53 in Braintree. No striped shoulders currently exist (refer to p. 9).

4 Upgrade sidewalks; make curb cuts more defined (refer to p. 9)

5 Install a flashing beacon at the Dunkin' Donuts/Viking Club driveways (refer to p. 11)

6 Upgrade the signal heads at the pedestrian signal north of Bickford Rd. Add signage warning drivers of signals at Route 53 at Hayward St, and at the pedestrian crossing just north of Bickford Rd. (refer to p. 12)

7 Weymouth Landing commuter rail station area improvements (refer to p. 13)

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Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

(✳) = Flashing red/yellow

FIGURE C-4
Braintree: Route 53 Layout and Locations of Transportation Improvements

5 ***The #400–499 blocks of Route 53 (Quincy Avenue):*** *According to Braintree police, there are especially high numbers of vehicle crashes on this section of Route 53.*

This 300 m (1,000 ft)-long, four-lane, undivided section is on a straight incline just south of the Quincy line, with the southern end being on the higher end of the incline. The roadway levels off near #400 Quincy Avenue, thereby creating some deterioration in vertical sight distance for drivers travelling in both directions.

There are numerous curb cuts in the section: twelve driveways and side streets on the northbound and twelve on the southbound side. Based on Braintree police data, twenty crashes were recorded here during January 1999–June 2001. Contributing to the vehicle conflicts and crashes is the presence of a Dunkin' Donuts driveway on the northbound side in the area of change of vertical alignment. Of the twenty crashes, 80% were angle, and more than one-third of all crashes involved vehicles entering or exiting the Dunkin' Donuts driveway.

The posted speed limit of 35 mph appeared, based on field observations, to have often been exceeded. This presumably contributed to the prevalence of crashes, since vehicles entering or exiting driveways across two lanes were not able to maneuver fast enough to avoid colliding with oncoming through traffic. This also helps to explain why a full 50% of all crashes involved personal injuries (see Table B-12a and Figure B-5a in Appendix B).

Recommended improvements:

- *Short-range: The posted speed limit (35 mph) in this straight incline of Route 53 needs to be enforced more rigorously.*
- *Short-range: Installation of a flashing control beacon should be considered at the point where the vertical road alignment changes. This is approximately where the Dunkin' Donuts driveway is located.*

The local police department and state police have jurisdiction over enforcing the speed limits on Route 53. The Town of Braintree has jurisdiction over the installation of a flashing beacon at the recommended location.

Assessment: An increased police presence and a regular campaign to ticket drivers exceeding the speed limit will give a warning that speeding will not be tolerated.

The addition of a flashing signal would alert all drivers that vehicles may be entering or exiting nearby driveways. The signal faces would be flashing yellow in the Route 53 direction of travel, and flashing red for vehicles exiting Dunkin' Donuts (northbound side) and the Viking Club (southbound side). Flashing beacons, according to the Manual on Uniform Traffic Control Devices (MUTCD), "may be used at intersections where traffic or physical conditions do not justify conventional traffic control signals but crash rates indicate the possibility of a special need."[9] Although the number of crashes at this location is not excessively high, it is acknowledged that the busy Dunkin' Donuts driveway, the reduction in vertical sight distance,

[9] U.S. Department of Transportation, Federal Highway Administration, "Manual on Uniform Traffic Control Devices, Part 4, Highway Traffic Signals," 2001, p. 4K-1 (section 4K.02).

and prevailing travel speeds exceeding the 35 mph posted speed limit, all make the case for enhancing safety by installing a flashing beacon.

6 ***The #200–299 blocks of Route 53 (Quincy Avenue):*** *According to Braintree police, there are especially high numbers of vehicle crashes on this section of Route 53.*

This section of Route 53 is approximately 300 m (1,000 ft) in length. It stretches from Bickford Road to Hayward Street, is hilly and curved, and has a crest near Trefton Drive (see Figure C-4). There are numerous driveways and side streets from which left turns are difficult because the line of sight is obscured by a bend in the road or by the hillcrest. Of the twenty-four crashes in the section recorded by the Braintree police during January 1999–June 2001, 46% were angle and 42% were rear-end (see Table B-12b and Figure B-5b in Appendix B).

The posted speed limit is 35 mph, but field observations found that traffic regularly exceeded 40–45 mph. Since most of the crashes occurred during off-peak hours, it is likely that excessive speed was a contributing factor, particularly in those cases where a wet road surface was present. Excessive speed may also explain the fact that 50% of all crashes resulted in personal injury.

Recommended improvements:

- *Short-range: The posted speed limit in this curved, hilly section of Route 53 needs to be enforced more stringently.*
- *Short-range: Replace the existing signal heads with new LED signal heads at the signalized pedestrian crossing north of Bickford Road.*
- *Short-range: Add signage south of Hayward Street warning northbound drivers of a signal ahead. Add signage north of Bickford Road warning southbound drivers of a pedestrian signal ahead.*

The local police departments and the state police have jurisdiction over enforcing the speed limits on Route 53. MassHighway has jurisdiction over upgrading traffic signals and adding signage.

Assessment: Just as in the #400–499 Quincy Avenue blocks, greater enforcement of the speed limit is recommended in order to reduce vehicle crashes in this section of Route 53. There are 28 driveways and side streets in the section (16 on the northbound and 12 on the southbound side) from which drivers make turns onto Route 53, so it appears that excessive speeds on Route 53 may be contributing to the numerous angle and rear-end conflicts.

Replacement of the existing signal heads with new LED signal heads will give drivers better advance notice of the pedestrian signal, sooner than they would see it from beyond the curved/inclined sections of the roadway.

The added signage warning drivers of signals ahead will enhance overall safety, and will minimize the effects of curves, obscured views, and locations with reduced sight distance.

Braintree/Weymouth

7 *One additional location where Braintree officials requested analysis and recommended improvements by CTPS was on* ***Route 53 at Commercial Street near the Braintree/Weymouth line.***

Specifically, there was a desire to coordinate the three traffic signals in the Weymouth Landing area, located about 0.16 km (0.1 mi) apart on Route 53. However, since these intersections are near the Weymouth Landing Station of the soon-to-be restored (by 2006) Greenbush branch of the Old Colony commuter rail line, it is expected that the associated MBTA traffic study will eventually develop transportation improvements throughout the Weymouth Landing area, including at these intersections (see Figure C-4).

Recommended improvements:

As described in a study issued by the MBTA in August 2002, final design plans have not been determined.[10] However, there has been agreement, in principle, between Braintree, Weymouth, and the MBTA that there will be:

- *A "shallow cut" grade separation where Route 53 currently crosses the Greenbush line right-of-way.*
- *A connector road between Quincy Avenue in Braintree and Commercial Street in Weymouth.*
- *Parking for the new Greenbush Line station totaling 335 spaces divided among three lots.*
- *A walking trail and park along Smelt Brook.*[11]

Weymouth

Route 53 (Washington Street) runs 5.1 km (3.2 mi) across central Weymouth from Braintree to Hingham. The northwesternmost 0.6 km (0.4 mi) section, from the Braintree line to Broad Street, is under local jurisdiction. The remaining 4.5 km (2.8 mi) are under state jurisdiction. There are six signalized intersections on Route 53 in Weymouth, and the roadway alternates between two and four travel lanes. Land use is a mix of residential and commercial, with industrially zoned land in the southernmost segment, south of Pleasant Street (see Figure C-5).

8 ***Route 53 in Weymouth:*** *Two sections of the roadway have no striped shoulders.*

Recommended improvement: *Restripe the lane markings on Route 53 so that, wherever possible, or when future reconstruction of Route 53 occurs, especially in the two sections described below, a 2.5 m (8 ft)-wide shoulder is added to both sides of the roadway.*

Assessment: To increase overall safety, as well as to provide space for emergency vehicle operations, MassHighway's Highway Design Manual recommends a minimum of 2.5 m (just over 8 ft)-wide shoulders on roadways classified as Urban Arterials.[12] North of Route 18 in Weymouth, Route 53 is classified as an Other Urban Principal Arterial, and south of Route 18 as

[10] Massachusetts Bay Transportation Authority, "Weymouth Landing Traffic Impact Study," August 2002.
[11] The Patriot Ledger, "T Officials Bend On Weymouth Landing Negotiations," December 16, 2002.
[12] The Commonwealth of Massachusetts, op. cit., p. 5.02.0.

LOCATIONS OF TRANSPORTATION IMPROVEMENTS:

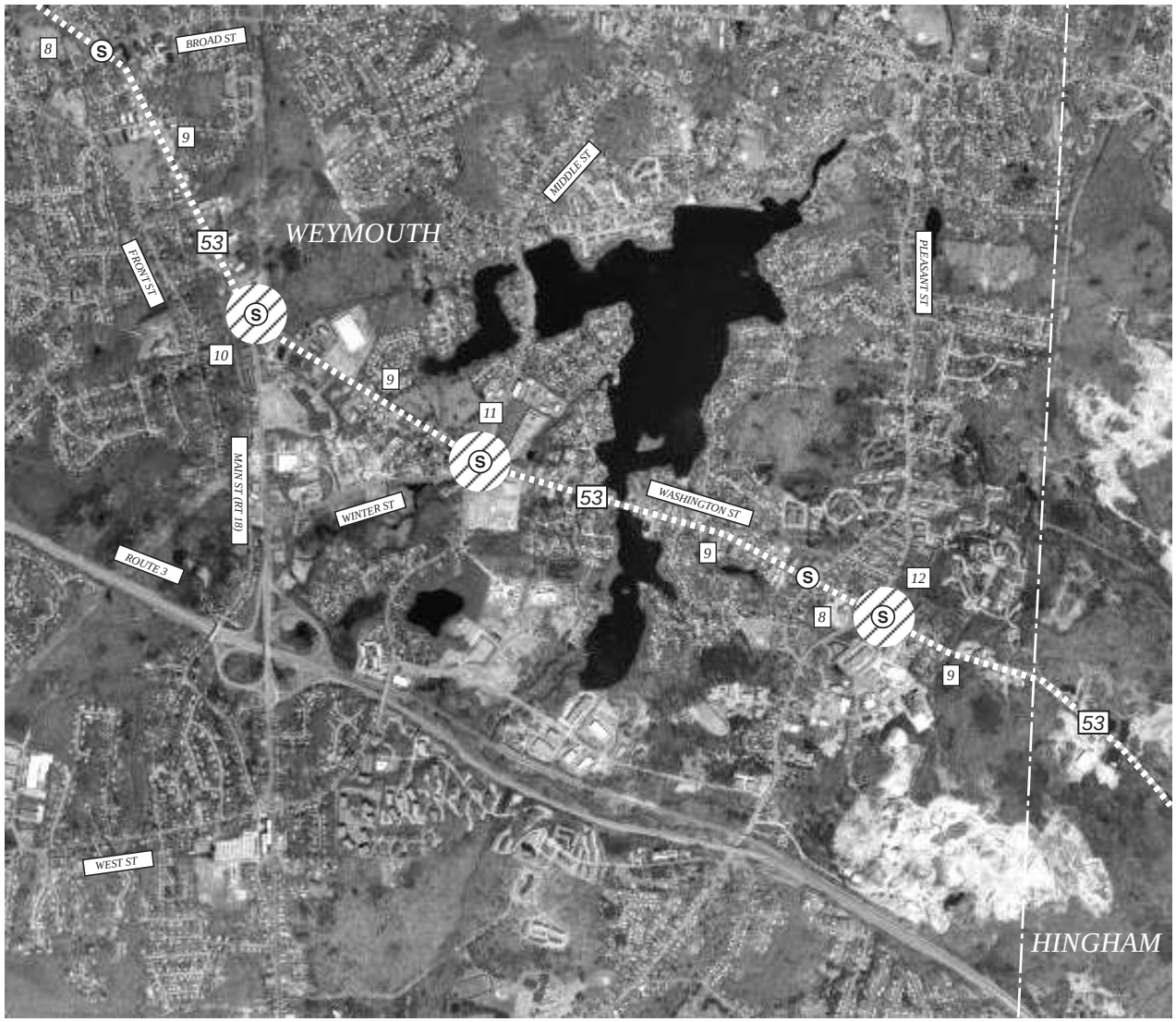
[8] If possible, add striped 2.5 m (8 ft) shoulders on both sides in two sections of Route 53 in Weymouth. No striped shoulders currently exist in these sections (refer to p. 13).

[9] Upgrade sidewalks; make curb cuts more defined (refer to p. 15).

[10] Intersection improvements completed at Washington St at Main St (Rt 18) during 2002 as mitigation for a new CVS drug store and Avalon Ledges apartment complex (refer to p. 15 and Figure C-6).

[11] Intersection improvements proposed at Washington St at Middle St as mitigation for a new Walgreen's drug store and Stop & Shop expansion (refer to p. 18 and Figure C-7).

[12] Improve the signal timing and phasing schemes at the intersection of Washington St at Pleasant St. Add left turn prohibition signage at driveways near the intersection (refer to p. 20 and Figure C-8).



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Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE C-5
Weymouth: Route 53 Layout and Locations of Transportation Improvements

an Urban Minor Arterial. There is a minimum of about 18 m (60 ft) of highway layout right-of-way on Route 53.

Most of Route 53 in Weymouth has striped shoulders, ranging from 0.6–2.5 m (2–8 ft) in width. There are two sections with no shoulders — one between Braintree and Broad Street is 0.8 km (0.5 mi) long; the other is a 0.3 km (0.2 mi)-long stretch between Mutton Lane and Pleasant Street. The first section has on-street parking and is under local jurisdiction, while the second does not have on-street parking and is under MassHighway's jurisdiction. Adding shoulders here could be short-range improvements.

While it appears possible to restripe the travel lanes so as to widen the shoulders in the section between Mutton Lane and Pleasant Street and retain two 3.75 m (12 ft)-wide travel lanes in both directions, it is uncertain if the same can be done between the Braintree line and Broad Street. Since on-street parking exists in that four-lane section, striped shoulders may not be added unless the travel lanes are reduced from 3.75 m (12 ft)-wide to 3.5 m (11 ft)-wide, which is the minimum recommended lane width for Urban Arterials.

9 ***Route 53 in Weymouth:*** *Sidewalks, driveways, and curb cuts have deteriorated and have become ill defined at some locations on Route 53.*

Recommended improvement: *As part of any future reconstruction of Route 53, upgrade and widen the sidewalks on both sides of the roadway to 2 m (6 ft). Consolidate curb cuts to commercial properties, if possible, while making entry and exit driveways more defined.*

These would be long-range improvements. MassHighway and the Town of Weymouth have jurisdiction.

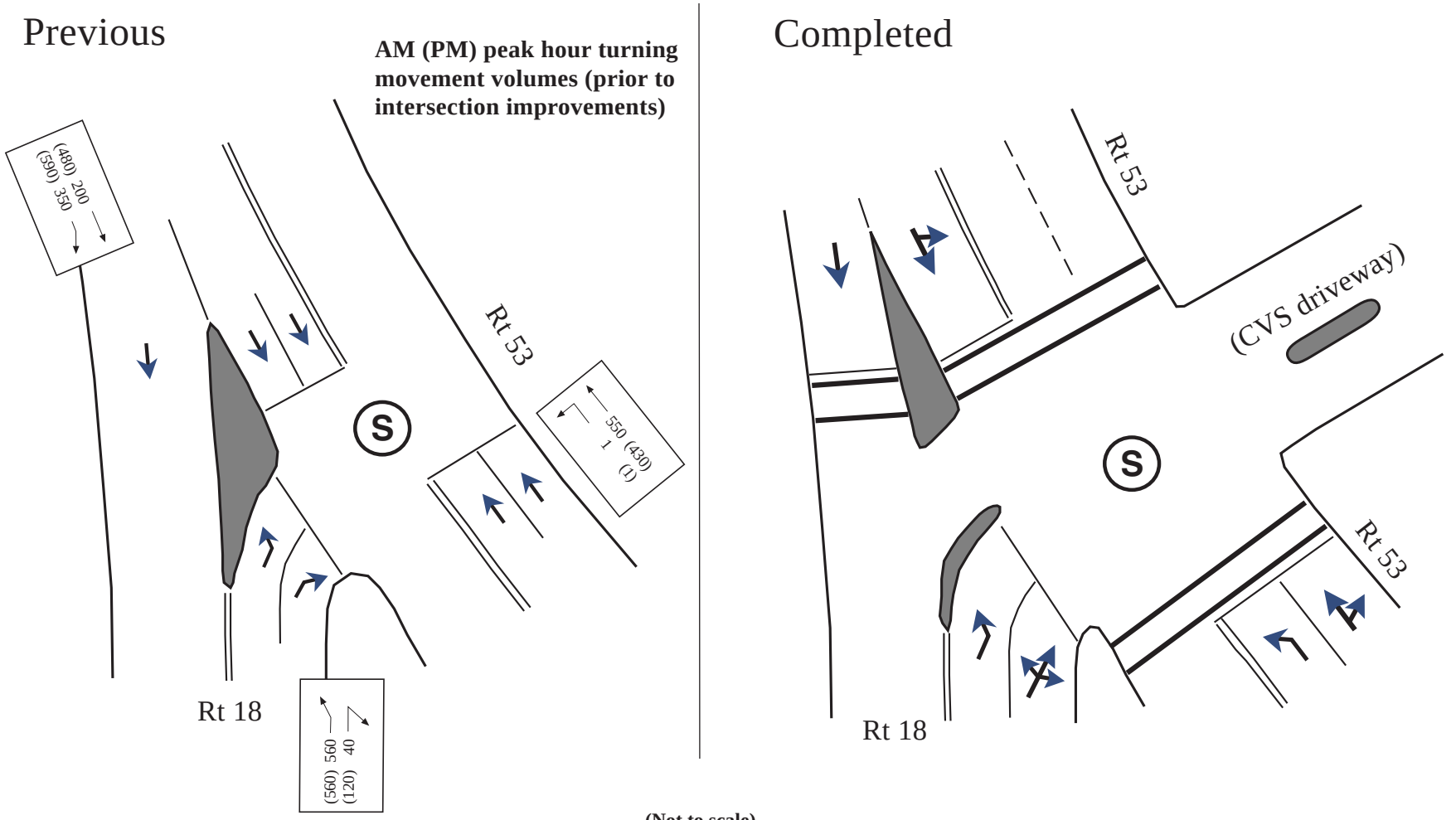
Assessment: In some cases, curb cuts to commercial establishments have become as wide as the entire property. As a result, the sidewalk and the curb cut have become one entity. MassHighway's Highway Design Manual recommends a sidewalk width of 2 m (6 ft). Regarding minimum widths, "a 1.0 meter minimum clearance must be maintained for wheelchairs with sufficient 1.6 meter zones for passing as required by the Americans with Disability Act (ADA)."[13] Also, "a minimum 1.0 meter wide wheelchair path of no more than 2% cross slope must be provided where a driveway crosses a sidewalk."[14]

10 ***Route 53 at Route 18 (Main Street):*** *The three-way intersection of Route 53 at Route 18 was reconstructed during 2002 as mitigation for a CVS drugstore and the nearby Avalon Ledges apartment complex.*

Completed improvements (see Figure C-6):

- *The traffic signal-phase sequence and intersection geometry was changed to allow for Route 53 northbound left turns to Route 18. An exclusive phase for northbound left turns and through traffic was added.*

[13] Ibid., p. 5.08.0.
[14] Ibid., p. 7.67.0.



(Not to scale)

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FIGURE C-6
Route 53 at Route 18 (Weymouth):
Previous Geometric Layout and Recently (2002) Completed CVS/Avalon Ledges–Related Mitigation

- *Geometric changes included widening and restriping the Route 53 northbound receiving lanes as two lanes.*
- *The Route 53 southbound approach was restriped to clearly display one through lane and one right-turn lane. The through lane is now 15 ft wide to accommodate left turns into the newly constructed CVS driveway.*
- *The Route 18 eastbound approach was widened to create one exclusive left-turn lane and one general purpose lane.*
- *Clearly marked pedestrian crossings, pedestrian push button activation, and an exclusive pedestrian phase were installed.*
- *Loop detectors, signs, and markings were installed for bicyclists.*

Assessment: The implemented intersection improvements appear to be sound. The future (2004) traffic volumes and LOS analysis project that the improvements will cause traffic operations to change from LOS D to C in the AM peak hour, and from LOS C to D in the PM peak hour (see summary table below). This is above LOS E or F, which represent unacceptable service levels; LOS E is sometimes regarded as tolerable in urban conditions.[15]

Pedestrian and bicycle traffic has been accommodated, while the minor widening and restriping of approach lanes and receiving lanes have eliminated confusion for drivers. The intersection now allows all turns in a protected manner with the addition of the Route 53 northbound left-turn lane and left-turn signal phase. This improvement cannot be over-emphasized, since many of the vehicles making left turns which are now allowed may have previously used Middle Street, 1.1 km (0.7 mi) to the south, and then Winter Street, in order to reach Route 18. The improvements of Route 53 at Route 18 should benefit these other congested intersections and roadways to the south.

Route 53 at Route 18 (Main Street) Intersection Summary:

- Intersection LOS data:

	AM Peak Hour			PM Peak Hour		
Scenario	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)
1999 Existing	C	26	29	B	19	29
2004 No-Build	D	39	41	C	27	40
2004 Build	C	35	N.A.	D	44	N.A.

- Number of vehicle crashes 1995–1997 (MassHighway): 45 (15 per year)
- Crash rate (prior to improvements): 1.61 crashes per million entering vehicles (District 4 average: 0.87)

Source: Rizzo Associates, Inc., Framingham, MA, 2001.
Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

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[15] Rizzo Associates, Inc., "Functional Design Report, Washington St. (Rte 53) at Main St. (Rte 18), Weymouth, Massachusetts," January 2, 2001.

11 ***Route 53 at Middle Street:*** *Improvements at this four-way intersection are planned as mitigation for a recently completed Walgreen's drugstore and for the expansion of a nearby Stop and Shop supermarket.*

No time frame exists for the implementation of the improvements. MassHighway has jurisdiction over any improvements at this intersection. The planned project is listed in the "Supplemental List of Projects" section of the FY 2004 TIP.[16]

Planned improvements (see Figure C-7):

- *According to the conceptual improvement plans, exclusive left-turn lanes will be added to the existing two general purpose lanes on both Route 53 approaches.*
- *An exclusive left-turn traffic signal phase will be added for these turning movements.*
- *The two receiving lanes on Route 53 north of the intersection will be extended to about 90 m (300 ft) in length before merging back to one lane.*
- *It is presumed that improvements for pedestrians will include restriped crosswalks, which are currently worn away, as well as pedestrian activation buttons.*

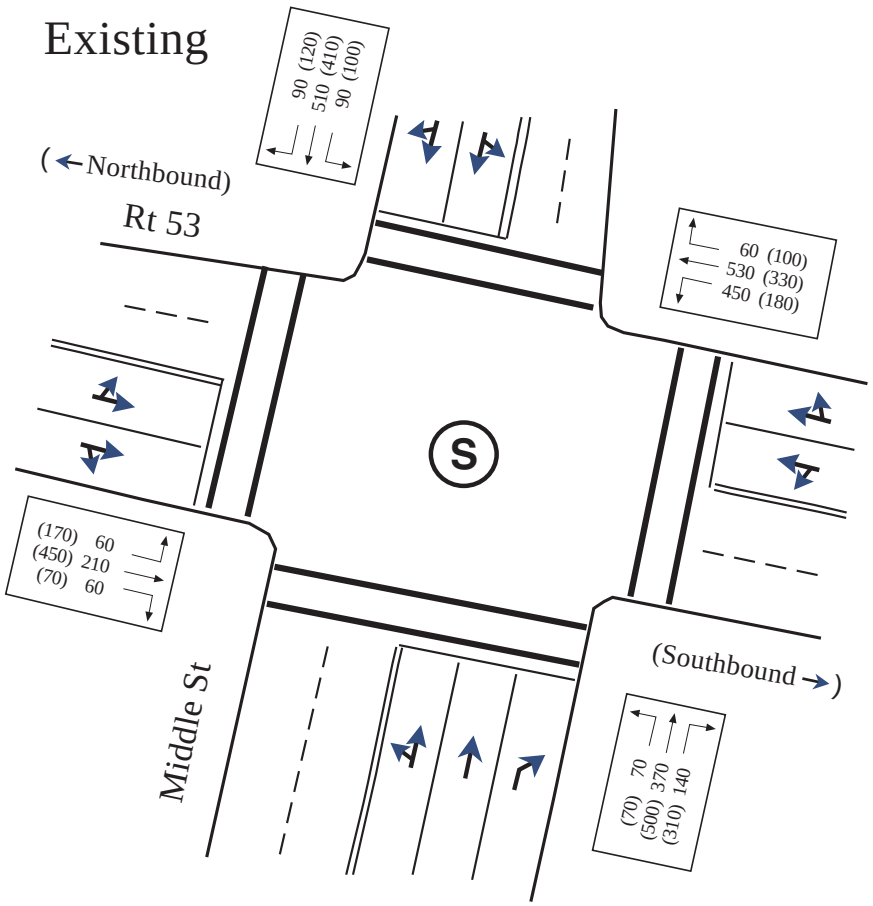
Assessment: The planned widening of the two Route 53 approaches makes sense. With the intersection being on an officially designated truck route, and with 450 existing left turns from Route 53 northbound to Middle Street in the AM peak hour, exclusive left-turn lanes should improve traffic operations and safety.

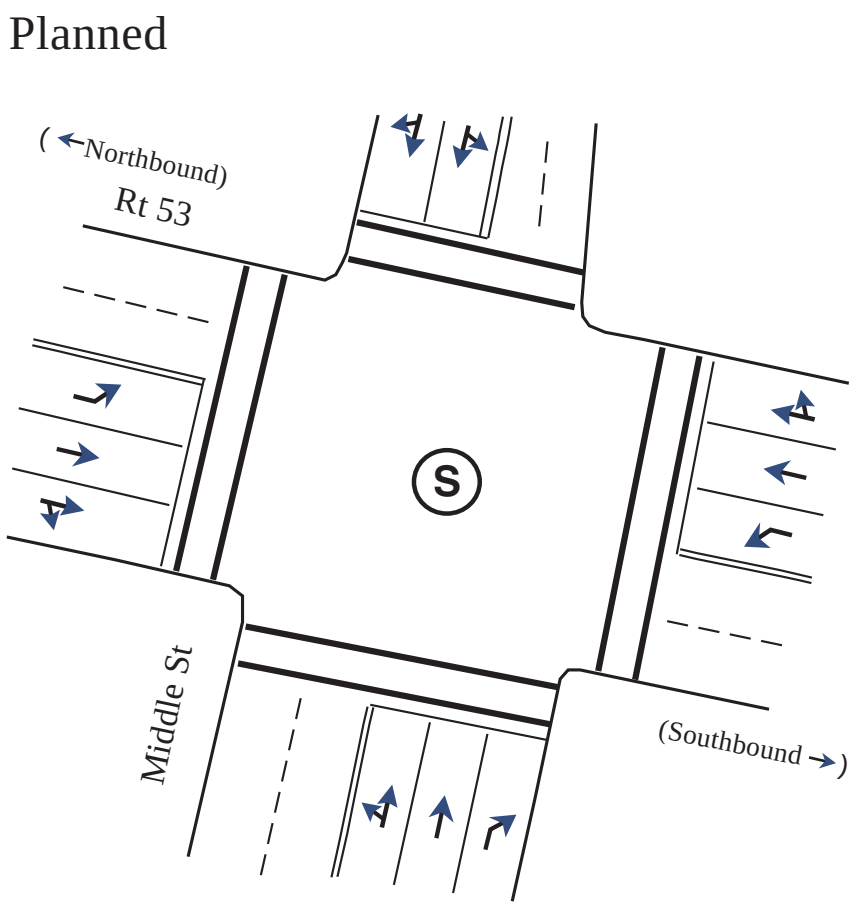
The exclusive left-turn lanes should also help to lower the number of crashes at this high-crash location. It was listed as #268 on MassHighway's list of high-crash locations for the years 1997 to 1999.

With the widening, analysis shows the intersection LOS improving in both the AM and PM peak hours in 2005 and 2025. Only in the 2025 AM peak hour does LOS deteriorate to LOS F (see summary table on page 20).[17]

[16] Boston MPO, op. cit., p. A-29.

[17] The LOS values shown are estimates by CTPS based on available counts (2000) and signal data observed in the field, with and without the proposed improvements. There was no LOS analysis available as part of an existing traffic study of the location.





Existing intersection layout and AM (PM) peak hour turning movement volumes

(Not to scale)

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Route 53 Corridor Transportation Plan

FIGURE C-7
Route 53 at Middle Street (Weymouth): Existing Geometric Layout and Planned Walgreen's/Stop and Shop–Related Mitigation

Route 53 at Middle Street Intersection Summary:

- Intersection LOS data:

Scenario	AM Peak Hour LOS	AM Peak Hour Intersection Delay (sec.)	AM Peak Hour Total Avg. Queue (# veh.)	PM Peak Hour LOS	PM Peak Hour Intersection Delay (sec.)	PM Peak Hour Total Avg. Queue (# veh.)
2000 Existing	F	*	111	F	*	93
2005 No-Build	F	*	118	F	*	99
Build Alt. 1	E	78	90	D	53	79
2025 No-Build	F	*	151	F	*	144
Build Alt. 1	F	*	112	E	65	99

- Number of vehicle crashes, 1996–1998 (Mass. Registry): 78 (26 per year)
- Crash rate: 2.29 crashes per million entering vehicles (District 4 average: 0.87)
- Jurisdiction over improvements: MassHighway

* = 80 or more seconds total delay for signalized intersections, 50 or more seconds for unsignalized intersections.
Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

12 ***Route 53 at Pleasant Street:*** *Poor geometric and operational conditions exist at the intersection of Route 53 at Pleasant Street.*

Through data collection and field work, the concerns can be further specified as:

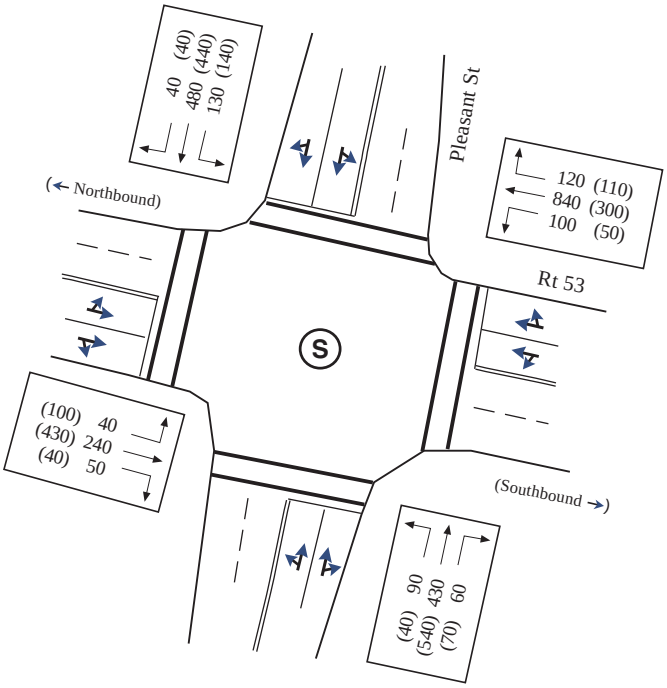
- 77% of all crashes were classified as angle. Most of these were left-turning vehicles colliding with through vehicles.
- Nearly 20% of crashes involved vehicle conflicts at commercial driveways adjacent to the intersection (see Table B-13 and Figure B-6 in Appendix B).

The crash rate for this intersection is 0.94 crashes per million entering vehicles, just over the MassHighway District 4 average of 0.87. Due to commercial and residential development on all four corners, there appears to be limited land available for expanding this intersection. However, a number of conceptual improvements were tested, including changing the signal timing and phasing schemes (short-range) as well as geometric improvements (long-range, involving land takings; see Figure C-8).

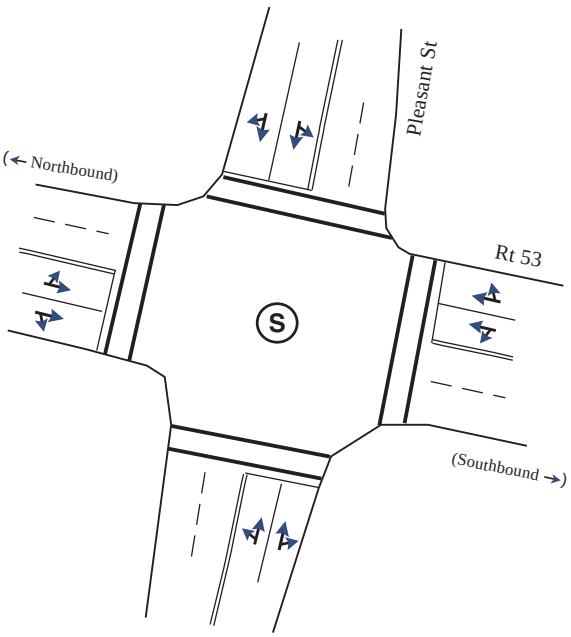
Recommended improvements:

- *Signal Adjustment 2: Improve the signal timing and phasing schemes. There would be leading phases for westbound and northbound traffic during the AM peak period, and leading westbound and southbound phases during the PM peak period, respectively. The existing concurrent pedestrian phases would remain.*
- *Add signage prohibiting left turns during the AM and PM peak periods for vehicles exiting one of the two driveways on each of the northeast and southwest corners, respectively.*[18]
- *Add loop detectors, signs, and markings for bicyclists.*

[18] Federal Highway Administration, "Manual on Uniform Control Devices (MUTCD), Millenium Edition," 2001, sign R3-2, p. 2B-15.

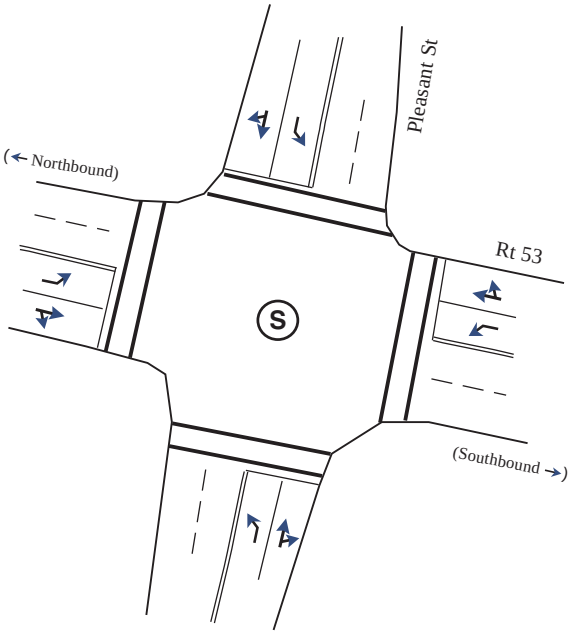


Existing intersection layout and AM (PM) peak hour turning movement volumes



Signal Adjustments 1 and 2 (no geometric changes)

Alternative 1: Exclusive left-turn lanes on all four approaches, using an existing lane



Alternative 2: Exclusive left-turn lanes on all four approaches, adding a new lane

(Not to scale)

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Route 53 Corridor Transportation Plan

FIGURE C-8
Route 53 at Pleasant Street (Weymouth): Intersection Improvement Alternatives Analyzed

These are short-range improvements, and they fall under the jurisdiction of MassHighway.

Assessment: The summary table below shows that the intersection currently operates at LOS D in the AM peak hour and LOS C in the PM peak hour. Changing the signal timing and phasing schemes using existing traffic volumes (Signal Adjustment 2 in the table, the recommended improvement scenario) would not markedly change operational LOS (remaining at D and C, respectively). However, green time would be distributed more effectively, and the approaches with more numerous left turns (westbound and northbound, AM peak period; westbound and southbound, PM peak period) would have leading phases, protecting turning vehicles and thereby reducing the risk of vehicle crashes.

Operational LOS is also acceptable in 2005 under the Signal Adjustment 2 scenario (D and C, respectively). In 2025, however, traffic volumes and congestion increase so that the intersection operates at LOS F in the AM peak hour, and LOS E during the PM peak hour.

The two build scenarios, Alternatives 1 and 2, are not realistic. Build Alternative 1 creates exclusive left-turn lanes on all approaches by taking an existing travel lane. As a result, intersection LOS deteriorates dramatically. In Build Alternative 2, exclusive left-turn lanes are added to the two existing travel lanes on all four approaches. LOS improves significantly; however, creating five-lane cross sections does not appear to be feasible, given that commercial and residential land use exists on all four corners of the intersection.

Route 53 at Pleasant Street Intersection Summary:

- Intersection LOS data *(suggested improvement, Signal Adjustment 2)*:

	AM Peak Hour			PM Peak Hour		
Scenario	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)
2000 Existing	D	44	48	C	29	33
Signal Adj't 1	C	32	44	B	20	28
Signal Adj't 2	D	46	46	C	25	29
2005 No-Build	D	50	50	C	32	32
Signal Adj't 1	D	36	48	C	20	29
Signal Adj't 2	D	49	47	C	26	30
Build Alt. 1	F	*	158	E	64	88
Build Alt. 2	C	28	43	C	22	32
2025 No-Build	F	*	71	D	51	42
Signal Adj't 1	E	68	68	C	24	36
Signal Adj't 2	F	*	68	E	67	65
Build Alt. 1	F	*	>160	F	*	113
Build Alt. 2	C	34	53	C	23	36

- Number of vehicle crashes, 1998–2000 (Weymouth police): 26 (8.7 per year)
- Crash rate: 0.94 crashes per million entering vehicles (District 4 average: 0.87)
- Jurisdiction over improvements: MassHighway

* = 80 or more seconds total delay for signalized intersections, 50 or more seconds for unsignalized intersections.
Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

Adding signage prohibiting left turns during the AM and PM peak periods from the northeast corner property to Route 53 southbound, and from the southwest corner property to Pleasant Street westbound, will help to reduce vehicular crashes. Each of these two properties has a second driveway from which all turns would continue to be allowed.

Finally, it is acknowledged that the planned Erickson Retirement Community, to be located one mile to the south in Hingham, may have an impact on traffic operations at surrounding intersections (see #13 below). To what extent Route 53 at Pleasant Street will actually be impacted, and at which times during the day, is unclear. However, it is assumed that the growth rates used to produce 2005 and 2025 volumes in this plan, and used to test all alternatives for Route 53 at Pleasant Street, have accounted for any eventual increases in traffic generated by all planned developments in the corridor, including the Erickson Retirement Community (see Appendix C-1).

Hingham

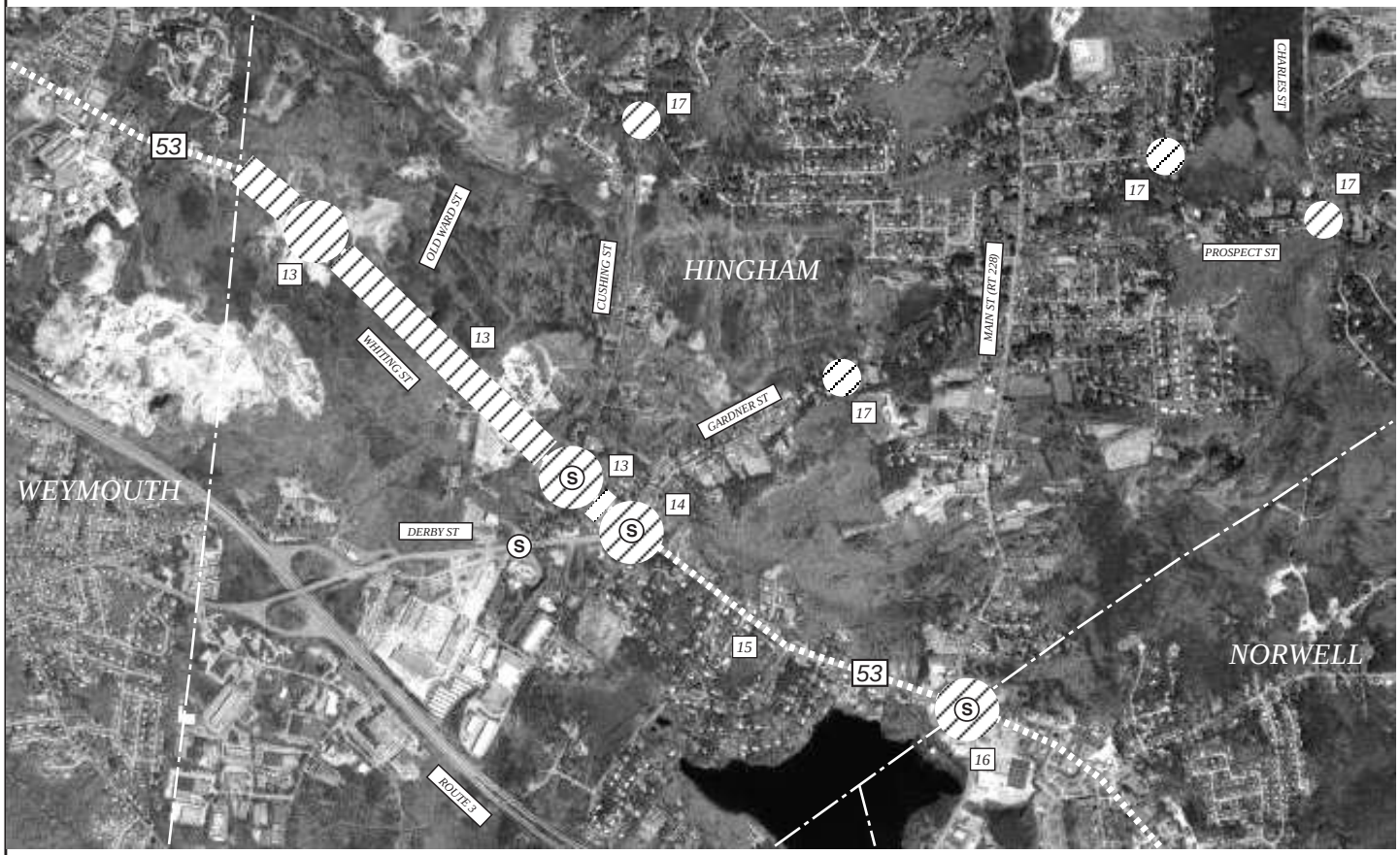
Route 53 (Whiting Street) in Hingham stretches from the Weymouth line 3.5 km (2.2 mi) southeast to the Norwell line, and is under state jurisdiction. The roadway is a two-lane facility from Weymouth to the Gardner Street/Derby Street intersection. From that intersection, Route 53 has four travel lanes to Queen Anne's Corner (the intersection of Route 53 and Route 228/Main Street), located on the Norwell line. Including Queen Anne's Corner, there are three signalized intersections on Route 53 in Hingham. Abutting land use is residential and commercial south of the Gardner Street/Derby Street intersection, and mostly forest, with some residential and commercial, north of the intersection (see Figure C-9).

13 ***Route 53 west of Old Ward Street:*** *A new driveway accessing Route 53 is planned as part of the development of the Erickson Retirement Community.*

The development, located on the east (northbound) side of Route 53, consists of 2,226 residential units for seniors, and includes 1,925 parking spaces. A driveway would be built from the development to Route 53, about 600 ft west of Old Ward Street. Once construction begins, mitigation for the project would likely be short-range.

Planned improvements (see Figure C-10):

- *The planned site driveway would consist of two exiting and two entering lanes with a 3 m (10 ft)-wide median island. The two exiting lanes would be exclusive left- and right-turn lanes.*
- *The intersection with Route 53 is planned to be unsignalized. At the intersection, there would be a 40 m (125 ft)-long exclusive left-turn lane southbound, and a 40 m (125 ft)-long exclusive right-turn lane northbound.*
- *Sidewalks would be constructed at the site in order to accommodate pedestrian traffic.*
- *A shuttle bus would be provided for employees and residents for shopping and recreational activities.*



LOCATIONS OF TRANSPORTATION IMPROVEMENTS:

13 A new three-way intersection with Route 53, with exclusive turning lanes and other mitigation, is proposed for the Erickson Retirement Community (refer to p. 23 and Figure C-10).

14 Make signal timing and geometric improvements at Route 53 at Derby St/Gardner St (refer to p. 26 and Figure C-11).

15 If possible, add striped 2.5 m (8 ft) shoulders on both sides of Route 53 between Derby St/ Gardner St and Main St (Route 228) in Hingham. No striped shoulders currently exist in this section (refer to p. 29).

16 Signal upgrade and capacity improvements at Route 53 at Route 228 (Queen Anne's Corner; refer to p. 30 and Figure C-13).

17 Add traffic-calming measures on local roadways used as bypasses (refer to p. 33).

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Route 53 Corridor Transportation Plan

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Aerial photo source: MassGIS and MIT

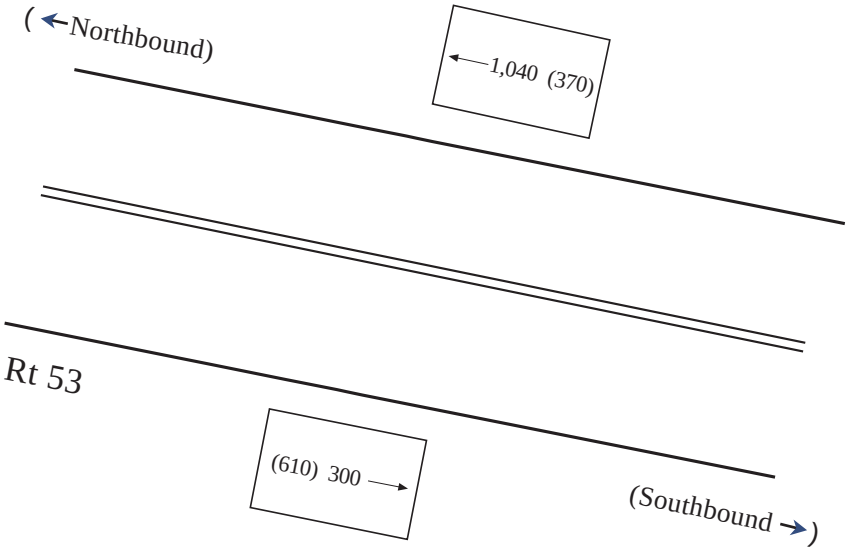
KEY:

(S) = Signalized intersection

= Flashing red/yellow

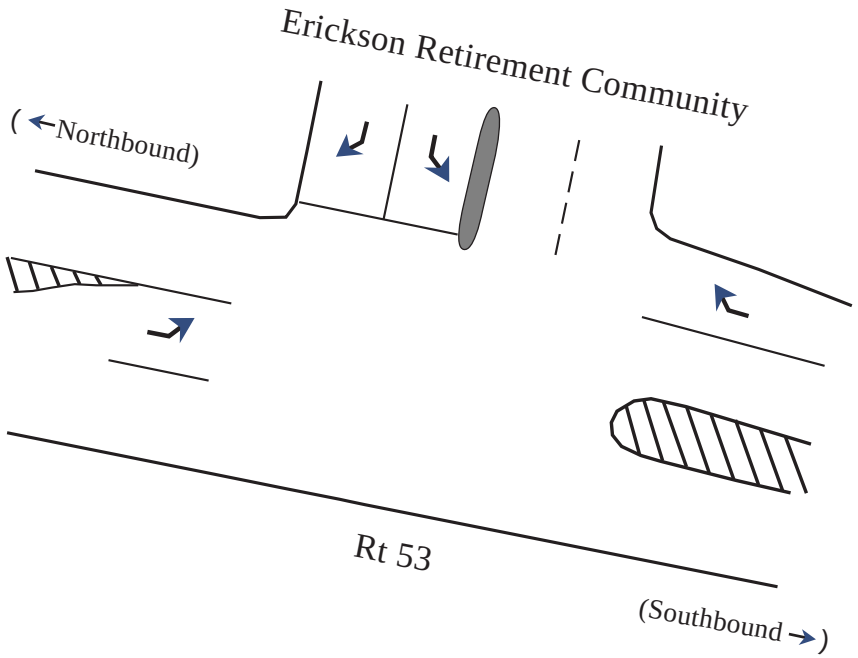
FIGURE C-9
Hingham: Route 53 Layout and Locations of Transportation Improvements

Existing



Existing highway layout and AM (PM) peak hour volumes

Planned



(Not to scale)

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Route 53 Corridor Transportation Plan

FIGURE C-10
Route 53 at Erickson Retirement Community Driveway, (Hingham): Existing Geometric Layout and Planned Mitigation

- *At other locations, recommended improvements by the project proponent include enhancements at the intersection of Route 53 at Cushing Street, 1.3 km (0.8 mi) to the south, and at Derby Street/Gardner Street, another 0.3 km (0.2 mi) to the south. At the Cushing Street intersection, the proponent proposes an exclusive right-turn lane on Route 53 southbound, and an exclusive left-turn lane in the northbound direction. The existing traffic signal would be updated with retiming and a new controller. Recommended improvements at Route 53 at Derby Street/Gardner Street are limited to retiming the existing traffic signal during the PM peak period.*

Assessment: In the supplement to the project's Environmental Notification Form, comments by various agencies and groups are displayed, including those of the Executive Office of Environmental Affairs (EOEA) and the Metropolitan Area Planning Council (MAPC). This plan agrees with the comments by EOEA and MAPC that:

- A traffic signal warrant analysis be made for the planned intersection of Route 53 and the site driveway.
- An analysis of traffic operations in Weymouth at the Route 53 at Middle Street/Winter Street intersections and Route 53 at Pleasant Street intersection be included.
- The proponent should consider providing a sidewalk from the site driveway north to the existing sidewalk in Weymouth.[19]

This plan recommends these additional improvements:

- It is recommended that the planned shuttle bus system from the site to local destinations (e.g., retail, governmental) also include service to and from the South Weymouth commuter rail station.
- As part of the mitigation, it is recommended that the proponent not only add a sidewalk on the east (northbound) side of Route 53 between the site driveway and the Weymouth line, but also from the site driveway south to the Derby Street/Gardner Street intersection, a total of 2.1 km (1.3 mi). The addition of this sidewalk would not only improve accommodations for pedestrians in the Erickson Retirement Community and in the surrounding neighborhood; it would also eliminate the one segment in the northern 16 km (10 mi) of the Route 53 corridor between Quincy and Hanover which has no sidewalks at all.

14 ***Route 53 at Derby Street/Gardner Street:*** *This location experiences above average vehicle crash rates, as well as poor operational conditions on some of the five approaches to the intersection.*

The issues can be specified, as follows

- There were 42 crashes in the intersection during a recent three-year period (1998 through 2000), an average of 14 per year. The crash rate was 1.54 crashes per million entering vehicles, while the MassHighway District 5 average for signalized intersections was 0.85.

[19] ENSR International, a supplement to the "Environmental Notification Form, Hingham Campus, an Erickson Retirement Community," February 28, 2002, Section F.

- Operational LOS analysis showed that two approaches experienced congested conditions, particularly in the AM peak hour. The two approaches were Route 53 northbound and Gardner Street westbound.
- The Route 53 northbound queue exceeds the storage capacity of that approach.
- The presence of a Dunkin' Donuts on the southeast corner of the intersection (bounded by Route 53 northbound and Gardner Street westbound) contributes to numerous peak-period vehicle conflicts, near misses, and rear-end crashes (see Table B-14 and Figure B-7 in Appendix B).

Recommended improvements:

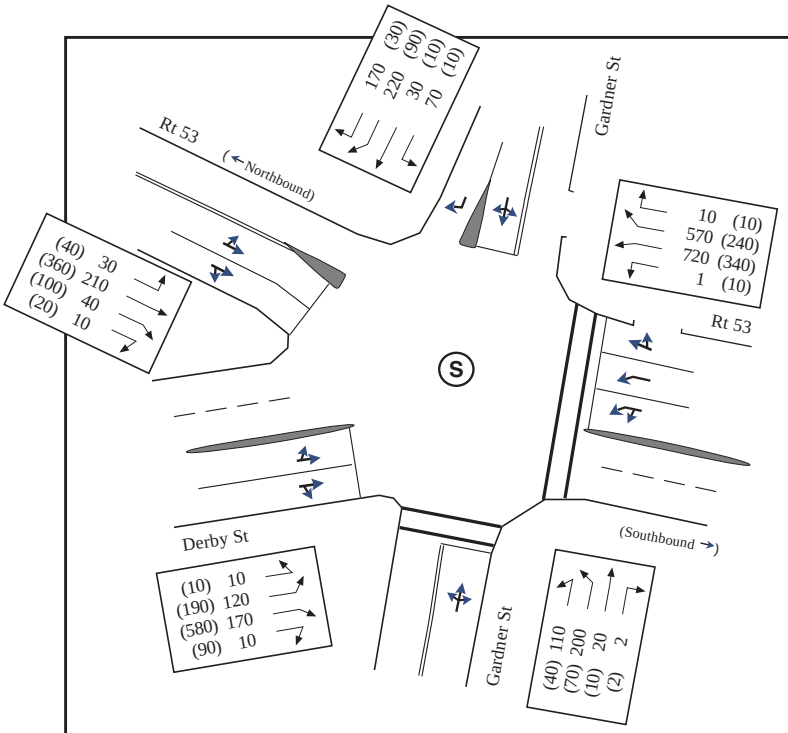
- *Short-range: Improve traffic operations by optimizing the intersection's existing AM and PM peak-period cycle lengths and signal timing settings. Concurrent pedestrian signal phases would be retained.*
- *Long-range: Widen Route 53 north of the intersection from one to two receiving lanes for approximately 75 m (250 ft) before merging back to one lane, and improve the storage capacity on Route 53 northbound by lengthening the right-most (outside) lane from approximately 60 m (200 ft) to 120 m (400 ft)* (see Figure C-11, *Build Alternative 1*).
- *Consider adding a raised median on Gardner Street east of Route 53* (Figure C-11, *Build Alternative 2).*
- *Add loop detectors, signs, and markings for bicyclists.*

These fall under the jurisdiction of MassHighway, except for the raised median on Gardner Street, which is the responsibility of the Town of Hingham.

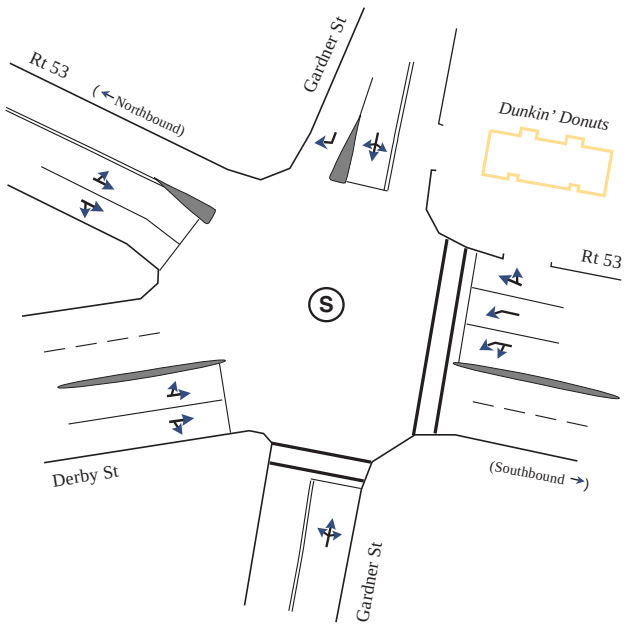
Assessment: Although the mitigation for the planned Erickson Retirement Community includes adjusting the signal timing for the PM peak period at Route 53 at Derby Street/Gardner Street, this plan recommends improving the signal timing for the AM peak period as well. As the summary table on page 29 shows, merely optimizing the existing cycle lengths and timing settings improves operational LOS from D to C in the AM peak hour, and from C, 31 seconds delay, to C, 21 seconds delay, in the PM peak hour.

Field observation of queues showed that the number of vehicles in the rightmost lane of Route 53 northbound usually exceeded the available storage capacity. Often, the demand of vehicles continuing on Route 53 northbound, or turning right on Gardner Street, was more than twice the estimated storage capacity of eight vehicles, especially during the AM peak period. Lengthening this lane would reduce the blocking of through traffic. However, at a minimum, some land takings from the parking area in front of one small office building would be required.

Two recommendations which could reduce the need to extend the rightmost lane on the northbound side of Route 53 are the signal optimization discussed above, which would reduce estimated queues and improve operational LOS, and the addition of a second receiving lane on Route 53 northbound for a distance of about 75 m (250 ft). This would enable vehicles continuing on Route 53 northbound to line up in the two rightmost lanes instead of in just one lane. The Route 53 highway right-of-way north of the intersection is estimated to be 20 m (66 ft); however, the existing curb-to-curb pavement appears to be about 12 m (40 ft) in width. Any widening to add a receiving lane would therefore require takings of the abutting properties.

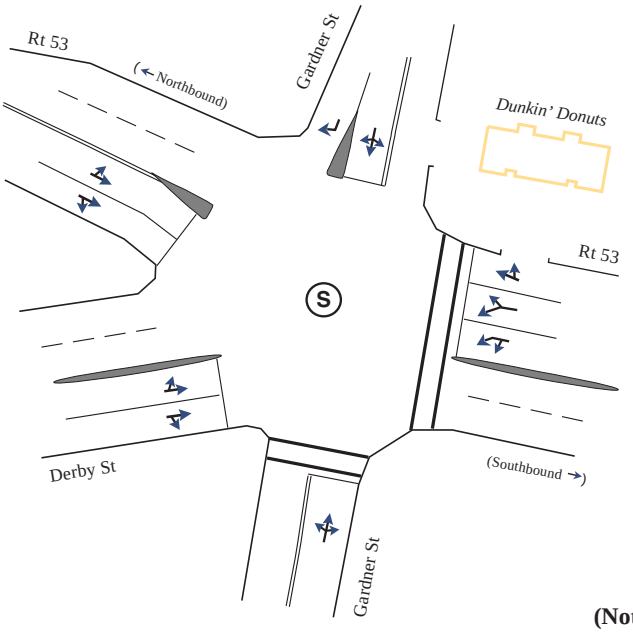


Existing intersection layout and AM (PM) peak hour turning movement volumes

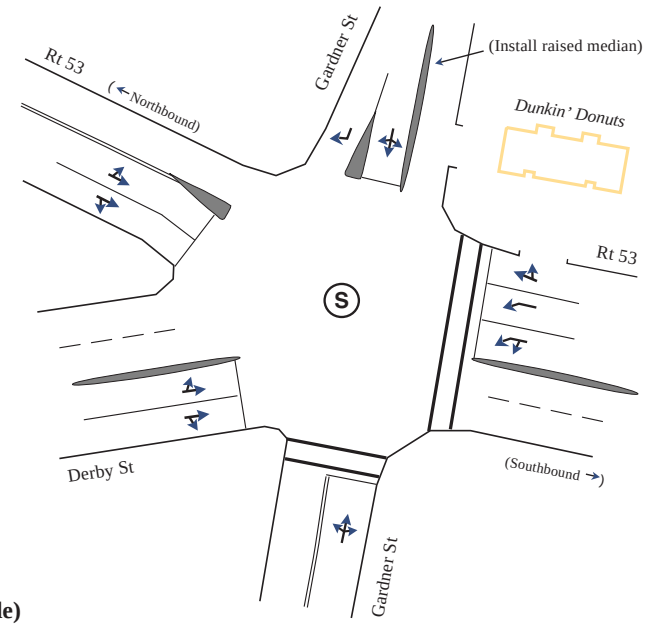


Signal Adjustment 1
(no geometric changes)

Alternative 1: Widen Route 53 northbound from one to two receiving lanes



Alternative 2: Raised median on Gardner Street



(Not to scale)

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Route 53 Corridor Transportation Plan

FIGURE C-11
Route 53 at Derby Street/Gardner Street (Hingham): Intersection Improvement Alternatives Analyzed

Route 53 at Derby Street/Gardner Street Intersection Summary:

- Intersection LOS data *(recommended improvement, Build Alternative 1)*:

	AM Peak Hour			PM Peak Hour		
Scenario	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)
2000 Existing	D	49	121	C	31	70
Signal Optim'n	C	34	92	C	21	42
2005 No-Build	D	52	127	C	32	71
Signal Optim'n	D	37	95	C	22	42
Build Alt. 1	C	31	78	C	23	44
2025 No-Build	E	66	159	D	42	85
Signal Optim'n	D	47	118	C	27	49
Build Alt. 1	D	36	112	C	30	61

- Number of vehicle crashes, 1998–2000 (Hingham police): 42 (14 per year)
- Crash rate: 1.54 crashes per million entering vehicles (District 5 average: 0.85)
- Jurisdiction over improvements: MassHighway, Town of Hingham

Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

The installation of a raised median on Gardner Street east of Route 53 is suggested for the Town of Hingham's consideration, based on field observations. During both the AM and PM peak periods, it was observed that vehicles entering or exiting Dunkin' Donuts continually impacted traffic operations negatively on Gardner Street by blocking traffic on Gardner Street and often creating near-collision conditions. A more short-range and low-cost remedy would be the installation of signage prohibiting left turns in and out of this driveway during the AM and PM peak periods (7:00–9:00 AM and 4:00–6:00 PM, respectively). However, it is suspected that the signs would only be as effective as the level of enforcement.

15 ***Route 53 in Hingham:*** There are no s*triped shoulders between the Derby Street/Gardner Street intersection and Queen Anne's Corner.*

Recommended improvement: *Restripe the lane markings in this section so that, if possible, or when future reconstruction of Route 53 occurs, a 2.5 m (8 ft)-wide shoulder is added to both sides of the roadway.*

Assessment: To increase overall safety, as well as to provide space for emergency vehicle operations, MassHighway's Highway Design Manual recommends a minimum of 2.5 m (just over 8 ft)-wide shoulders on roadways classified as Urban Arterials.[20] Route 53 is classified as an Urban Minor Arterial in Hingham. There is a minimum of about 18 m (60 ft) of highway layout right-of-way on Route 53.

The section of Route 53 between the Weymouth line and Derby Street/Gardner Street (a distance of 2.1 km, or 1.3 mi) currently has shoulders that are 0.6–1.2 m (2–4 ft) wide. The

[20] The Commonwealth of Massachusetts, op. cit., p. 5.02.0.

section between Derby Street/Gardner Street and Queen Anne's Corner (1.4 km, or 0.9 mi in length) has no striped shoulders. It is recommended that, whenever possible, both sections be upgraded to include striped shoulders of sufficient width. These improvements would be under MassHighway's jurisdiction.

Hingham/Norwell

16 ***Route 53 at Route 228 (Queen Anne's Corner):*** *ALTHOUGH IMPROVEMENTS AT THIS LOCATION HAD BEEN SCHEDULED TO BE IMPLEMENTED DURING 2003, THE TRANSPORTATION PLANNING AND PROGRAMMING COMMITTEE OF THE BOSTON MPO RECENTLY RECOMMENDED THAT THIS PROJECT BE DELETED FROM FY 2003 IMPLEMENTATION. THE PROJECT HAS BEEN PROPOSED FOR PROGRAMMING IN FY 2004.*

MassHighway has jurisdiction over all improvements at this intersection (see Figures C-9 and C-12). Reconstruction of the intersection is scheduled to begin during FY 2004, according to the latest TIP.[21]

Planned improvements:

- *All four approaches will be expanded to include exclusive left-turn lanes.*
- *Existing geometry on some of the approaches allows for two de facto, but not striped, travel lanes. These will be widened to standard-width lanes.*
- *There will be crosswalks on all four approaches, and concurrent pedestrian phasing as part of the upgraded phase sequence plan.*

Assessment: This is a very difficult intersection to improve. Commercial establishments are located nearby, making it difficult to carve out additional space for new travel lanes. It has also been one of the South Shore's most congested intersections over the years. In fact, total intersection volumes for the AM and PM peak hours have remained constant between 1984 and 1999, based on three sets of manual turning movement counts (1984, 1993, and 1999).

The planned improvement plan (see Figure C-13) appears to meet the demands of current traffic levels. As seen in the summary table on page 33, operational LOS in 2013 is expected to improve from LOS F to E in both the AM and PM peak hours.[22] It is unclear, however, how soon conditions may again become degraded should there be larger increases in peak-hour traffic than anticipated.

One improvement which may indirectly benefit the Queen Anne's Corner intersection is the planned addition of a two-way center left-turn lane on Route 53 south of the intersection, about one-half mile in length, to Grove Street/High Street (discussed in detail below in #18). By adding capacity for southbound left-turning traffic on that leg, it will minimize or reduce the potential for southbound through traffic queuing back into the intersection.

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[21] Boston MPO, op.cit., p. 3-19.

[22] Vanasse Hangen Brustlin, Inc. (VHB), "Functional Design Report, Route 53/Washington Street, Whiting Street, Norwell/Hingham, Massachusetts," May 26, 1994, pp. 8, 13.

LOCATIONS OF TRANSPORTATION IMPROVEMENTS:

18 Widen Route 53 between Queen Anne's Corner and Grove St/High St from two lanes to a three-lane cross section (refer to p. 35 and Figure C-14).

19 1.8 m (6 ft) shoulders to be added between Queen Anne's Corner and Grove St/High St as part of the widening project (refer to p. 37).

20 Signal upgrade and capacity improvements at Route 53 at Grove St/High St (refer to p. 37 and Figure C-15).

21 New signal at Jacob's Trail and geometric improvements southward to Route 123 were completed during 2002 as part of the Stop and Shop mitigation (refer to p. 39 and Figure C-16).

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Route 53 Corridor Transportation Plan

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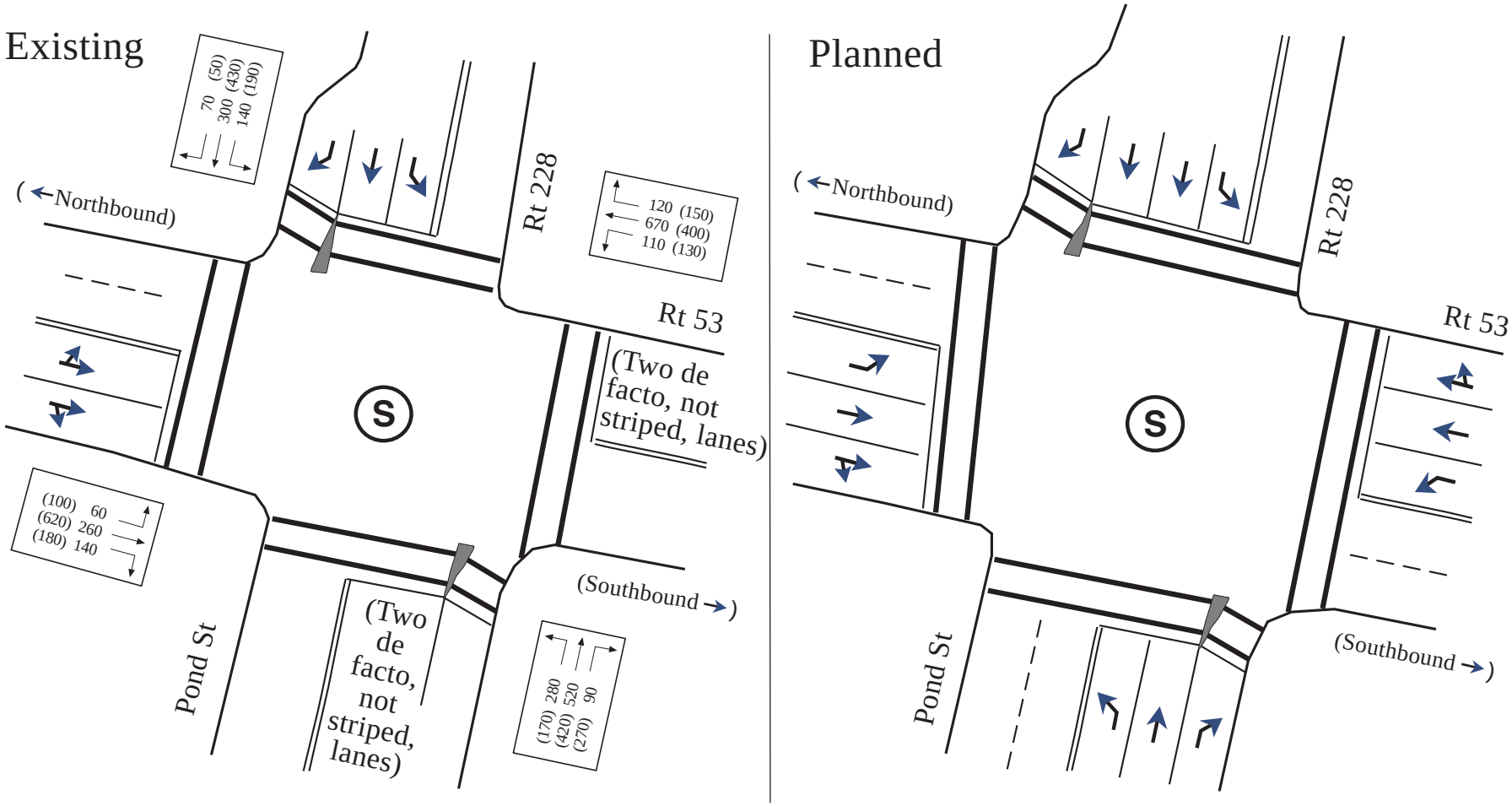
Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE C-12
Norwell: Route 53 Layout and Locations of Transportation Improvements



Existing intersection layout and AM (PM) peak hour volumes

(Not to scale)

CTPS

Route 53 Corridor Transportation Plan

FIGURE C-13
Route 53 at Route 228, Queen Anne's Corner (Hingham/Norwell): Existing Geometric Layout and Planned Transportation Improvements

Route 53 at Route 228 (Queen Anne's Corner) Intersection Summary:

- Intersection LOS data:

Scenario		AM Peak Hour LOS	AM Peak Hour Intersection Delay (sec.)	AM Peak Hour Total Avg. Queue (# veh.)	PM Peak Hour LOS	PM Peak Hour Intersection Delay (sec.)	PM Peak Hour Total Avg. Queue (# veh.)
1993		F	*	N.A.	F	*	N.A.
2013	No-Build	F	*	N.A.	F	*	N.A.
2013	Build	E	41	N.A.	E	46	N.A.

- Jurisdiction over improvements: MassHighway

Source: Vanasse Hangen Brustlin, Inc., Watertown, MA, 1994.
* = 80 or more seconds total delay for signalized intersections, 50 or more seconds for unsignalized intersections.
Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

17 ***Local roadways parallel to Route 228, near Queen Anne's Corner:*** *Vehicles are using local roadways to avoid peak-period congestion at Queen Anne's Corner.*

A local concern which seems related to the current congested conditions at Queen Anne's Corner is the fact that vehicles approaching the intersection from the east (Route 228), particularly during the AM peak period, may be using parallel local streets such as Cushing Street, Gardner Street, and Charles Street (to Prospect Street), as bypasses. It stands to reason that the more congested the Queen Anne's Corner intersection, the more likely it is that drivers will seek alternative routes to avoid the congestion.

Any capacity improvement at Queen Anne's Corner will make it more attractive to drivers (see #16 above), which would theoretically help to divert traffic from side streets currently used as bypasses. However, with capacity improvements, vehicles may return to Queen Anne's Corner in larger numbers than expected, thereby causing the improved intersection to again reach capacity sooner than anticipated. Then vehicles may once again return to the side streets to bypass a congested Queen Anne's Corner intersection.

In order to better understand the magnitude and towns of origin of vehicles using the side streets, CTPS collected license plate data at three locations during the fall of 2002. This information is highlighted below, as well as in the summary table on page 34.

- A combined total of 1,762 vehicles travelled southwest toward Route 53, between 7:00 and 9:00 AM, on Cushing Street, Gardner Street, and Prospect Street. At the same time, an estimated 1,180 vehicles travelled southwest towards Route 53 (Queen Anne's Corner) on Route 228 (Main Street, in Hingham).
- Of the 1,762 vehicles on the three side streets, 1,678 license plates were recorded. Of these, 1,190 license plates were successfully matched, a 71% match rate.
- 49% of all matched vehicles originated in Hingham.
- Another 32% of all matched vehicles originated in five neighboring towns (Scituate, Norwell, Weymouth, Hull, and Cohasset).

Towns of Origin of Vehicles on Three Side Streets Bypassing Queen Anne's Corner, (7–9 AM):

3 Side streets	Hingham	Scituate	Norwell	Weymouth	Hull	Cohasset	Other	Total
Matched vehicles	580	114	83	74	63	53	223	1,190
% of total	49	10	7	6	5	4	19	100

Cushing St at Rt 53	Hingham	Weymouth	Cohasset	Hull	Scituate	Boston	Other	Total
Matched vehicles	296	45	39	35	35	12	98	560
% of total	53	8	7	6	6	2	18	100

Gardner St at Rt 53	Hingham	Scituate	Norwell	Weymouth	Marshfield	Cohasset	Other	Total
Matched vehicles	191	72	48	19	17	11	75	433
% of total	44	17	11	4	4	3	17	100

Prospect St at Grove St (Norwell)	Hingham	Norwell	Hull	Weymouth	Hanover	Scituate	Other	Total
Matched vehicles	93	29	25	10	7	7	26	197
% of total	47	15	13	5	4	4	13	100

Source: CTPS, 2002.

Recommended improvements:

- *Short-range: Enforce the posted speed limit, which is 30 mph on all three side streets.*
- *Long-range: Install neighborhood traffic circles or speed tables as traffic calming measures.*

Assessment: The three side streets are all Urban Collectors under local jurisdiction, and all traverse residential neighborhoods. The license plate survey revealed that nearly one-half of all AM peak-period vehicles originate locally in Hingham, another one-third in the surrounding five communities. The existing posted speed limit on Cushing Street, Gardner Street, and Prospect Street is 30 mph. An effort to more stringently enforce the existing speed limit would make the side streets less attractive for cut-through traffic.

The installation of traffic circles or speed tables at appropriate locations can improve traffic conditions through the reduction of speeds, traffic volumes, and truck traffic (see Appendix C-2 for descriptions of these traffic calming measures). According to MassHighway, a traffic circle or a speed table on a collector road may bring moderate reductions in vehicle speeds, and low reductions in both overall and truck traffic.[23]

Possible locations for traffic circles on Cushing Street are the Ward Street intersection and the Old County Road/Plymouth River Road intersection. On Gardner Street, field observations showed no appropriate locations for a traffic circle. However, a speed table approximately halfway between Route 53 and Route 228 could be implemented. On Prospect Street, field observations revealed two potential locations where traffic circles could be installed, at Charles Street and/or at Hoover Road.

[23] MassHighway, "Traffic Calming Guidelines," November 2000, pp. 12–15.

Norwell

Land use along the 3.5 km (2.2 mi) section of Route 53 (Washington Street) in Norwell is mostly developed and is primarily commercial. Some residential use exists as well, particularly on the west (southbound) side of Route 53. The roadway has one general purpose lane in each direction except for turning lanes at the major intersections. Including Queen Anne's Corner, there are three signalized intersections on Route 53 in Norwell, as well as a signalized pedestrian crossing near Knollwood Road. The facility is under MassHighway's jurisdiction, and is classified as an Urban Minor Arterial (see Figure C-12 above).

18 ***Route 53 from Route 228 to Grove Street/High Street:*** *ALTHOUGH IMPROVEMENTS AT THIS LOCATION HAD BEEN SCHEDULED TO BE IMPLEMENTED DURING 2003, THE TRANSPORTATION PLANNING AND PROGRAMMING COMMITTEE OF THE BOSTON MPO RECENTLY RECOMMENDED THAT THIS PROJECT BE DELETED FROM FY 2003 IMPLEMENTATION. THE PROJECT HAS BEEN PROPOSED FOR PROGRAMMING IN FY 2004.*[24]

The information in this section is based primarily on the same Vanasse Hangen Brustlin (VHB) Functional Design Report referred to for Queen Anne's Corner (see #16 above).[25]

Planned improvements: *Widen the roadway to accommodate a two-way center left-turn lane between the two signalized intersections, Route 53 at Route 228 (Queen Anne's Corner), and Route 53 at Grove Street/High Street.*

Assessment: The resulting cross-section will be 15 m (50 ft), and will include a 4.3 m (14 ft) center lane, two 3.7 m (12 ft)-wide travel lanes, and 1.8 m (6 ft)-wide shoulders on both sides (see Figure C-14).

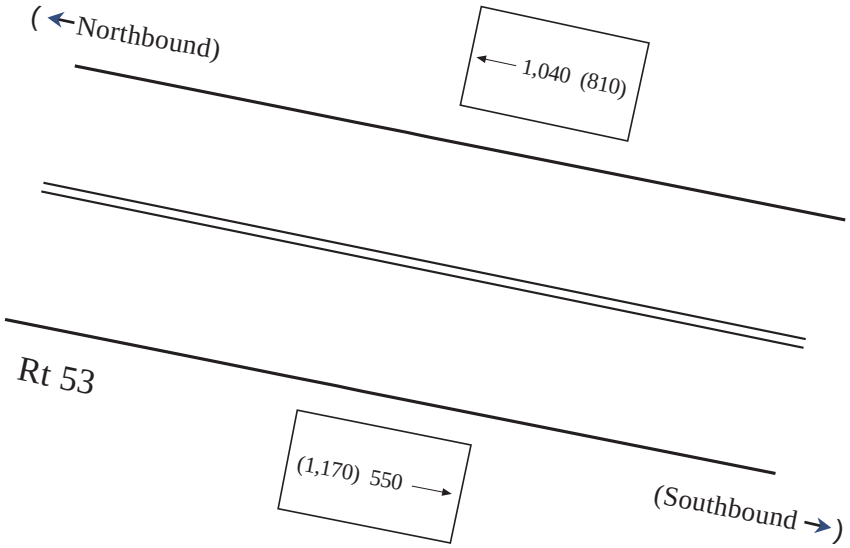
Given the limited amount of available land on either side of the roadway, it appears that a two-way center left-turn lane is a reasonable capacity improvement between the two intersections. As the Functional Design Report highlights, since left-turning vehicles will have their own storage area, conflicts between turning vehicles and through vehicles can be expected to decrease as a result.

A caveat with respect to the planned center lane is the fact that not all drivers may be familiar with this type of turning lane. Some drivers may treat the lane as a passing lane, thereby increasing the potential for head-on crashes with opposing left-turning traffic.

Another caveat is that the MassHighway Highway Design Manual recommends that two-way center left-turn lanes only be considered for two-lane roadways where daily traffic volumes are in the range of 5,000–12,000 vehicles per day. Although the number of left-turning vehicles is not known, daily traffic on this section total more than twice the upper end of this range. The combination of this planned design and the existing daily traffic volumes may not be ideal; however, it is acknowledged that measures need to be taken to reduce congestion in this section. Perhaps due to its relatively short length (one-half mile), it may be an acceptable design, given

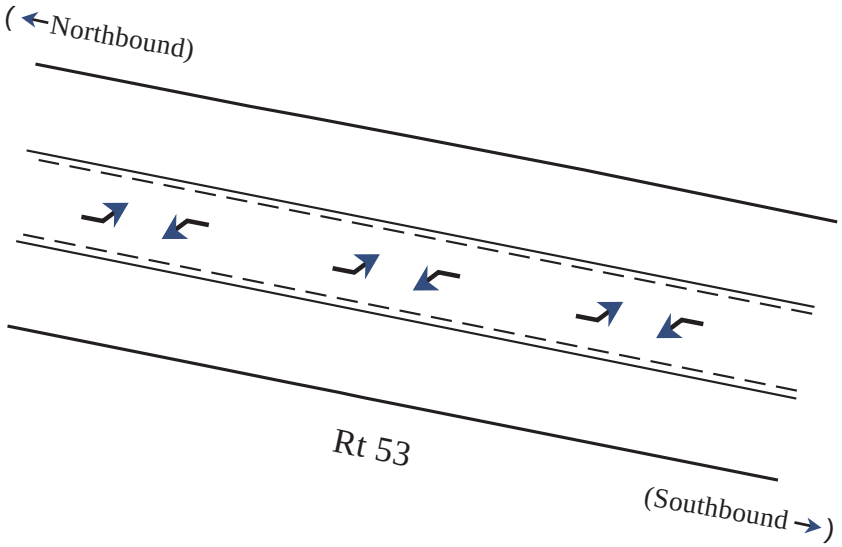
[24] Boston MPO, op. cit., p. 3-19.
[25] VHB, Inc, 1994, op. cit.

Existing



Existing highway layout and AM (PM) peak hour volumes

Planned



(Not to scale)

CTPS

Route 53 Corridor Transportation Plan

FIGURE C-14
Route 53 between Queen Anne's Corner and Grove Street/High Street (Norwell): Existing Geometric Layout and Planned Transportation Improvements

the difficulty of retrofitting the roadway with, for instance, an added traffic signal, consolidated driveways, or service roads behind the existing commercial establishments.[26]

Finally, there are sidewalks on both sides of this section of Route 53, but they are narrow and have uneven surfaces in places. It is recommended that these be widened and upgraded when the roadway is widened and improved.

19 ***Route 53 in Norwell:*** *Only 0–0.6 m (0–2 ft)-wide striped shoulders exist between Queen Anne's Corner and Grove Street/High Street.*

Planned improvement: *As part of the segment widening, striped shoulders 1.8 m (6 ft) wide will be added outside the travel lanes* (see #18 above).

Assessment: To increase overall safety, as well as to provide space for emergency vehicle operations, MassHighway's Highway Design Manual recommends a minimum of 2.5 m (just over 8 ft)-wide shoulders on roadways classified as Urban Arterials.[27] Route 53 is classified as an Urban Minor Arterial in Norwell.

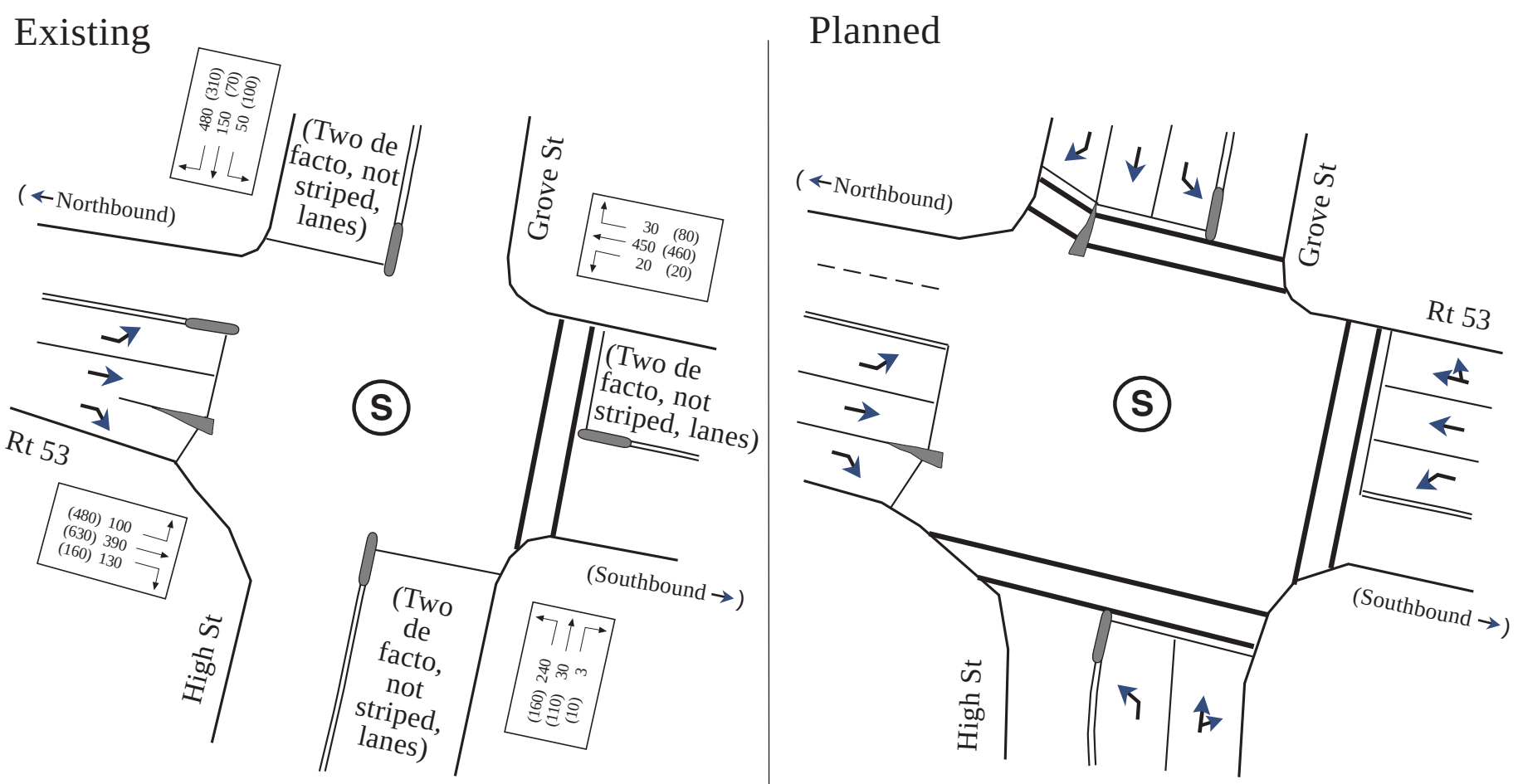
20 ***Route 53 at Grove Street/High Street:*** *ALTHOUGH IMPROVEMENTS AT THIS LOCATION HAD BEEN SCHEDULED TO BE IMPLEMENTED DURING 2003, THE TRANSPORTATION PLANNING AND PROGRAMMING OF THE BOSTON MPO RECENTLY RECOMMENDED THAT THIS PROJECT BE DELETED FROM FY 2003 IMPLEMENTATION. THE PROJECT HAS BEEN PROPOSED FOR PROGRAMMING IN FY 2004.*

MassHighway has jurisdiction over any improvements at this intersection. Reconstruction of the intersection is scheduled to begin during FY 2004, according to the latest TIP.[28] The information concerning this intersection is based on the same VHB Functional Design Report referred to earlier for Queen Anne's Corner (see locations #16 and 18 above).[29]

Planned improvements (see Figure C-15):

- *The eastbound approach (High Street) will expand to accommodate one exclusive left-turn lane and one shared through/right-turn lane.*
- *The westbound approach (Grove Street) will be widened to accommodate one exclusive left-turn lane, a through lane, and an exclusive right-turn lane.*
- *Northbound, Route 53 will receive an exclusive left-turn lane and two clearly defined through lanes. The right-hand lane would serve through traffic as well as right turns.*
- *The Route 53 southbound approach will retain its exclusive left-turn lane and one through lane, but the exclusive right-turn lane will receive additional storage capacity. Defined crosswalks will be added on the eastbound and westbound approaches.*

[26] The Commonwealth of Massachusetts, op. cit., p. 7.60.0.
[27] Ibid., p. 5.02.0.
[28] Boston MPO, op. cit., p. 3-19.
[29] VHB, Inc, 1994, op. cit.



Existing intersection layout and AM (PM) peak hour volumes

(Not to scale)

CTPS

Route 53 Corridor Transportation Plan

FIGURE C-15
Route 53 at Grove Street/High Street (Norwell): Existing Geometric Layout and Planned Transportation Improvements

Assessment: The planned improvements at this intersection appear to be appropriate. The provision of exclusive left-turn lanes on all approaches will help, particularly eastbound and southbound, where currently there are 240 and 480 left turns during the AM and PM peak hours, respectively. The summary table below shows that operational LOS will improve under 2013 conditions from LOS F to D in the AM peak hour, and from LOS F to C in the PM peak hour. Improved pedestrian facilities at the intersection will also be beneficial, since the land use nearby includes residential areas.

Route 53 at Grove Street/High Street Intersection Summary:

- Intersection LOS data:

	AM Peak Hour			PM Peak Hour		
Scenario	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)
1993	F	*	N.A.	F	*	N.A.
2013 No-Build	F	*	N.A.	F	*	N.A.
2013 Build	D	28	N.A.	C	23	N.A.

- Jurisdiction over improvements: MassHighway

Source: Vanasse Hangen Brustlin, Inc., Watertown, MA, 1994.
* = 80 or more seconds total delay for signalized intersections, 50 or more seconds for unsignalized intersections.
Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

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21 ***Route 53 at Jacob's Trail/Stop and Shop supermarket driveway:*** *This intersection was reconstructed during 2002 as mitigation for a new Stop and Shop supermarket.*

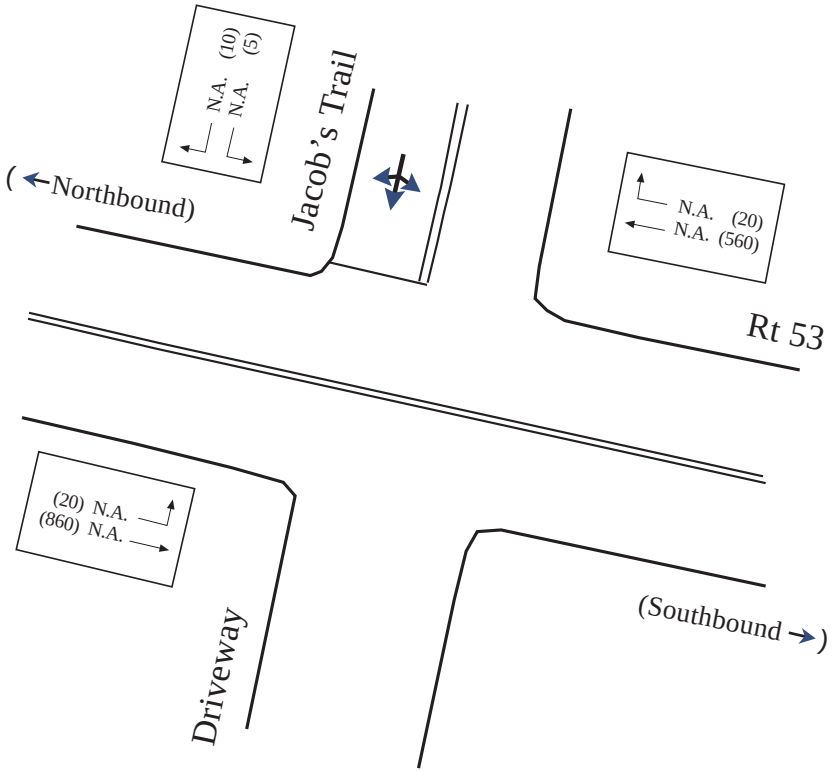
Information regarding this development is based on a traffic study by VHB.[30]

Completed improvements (see Figure C-16):

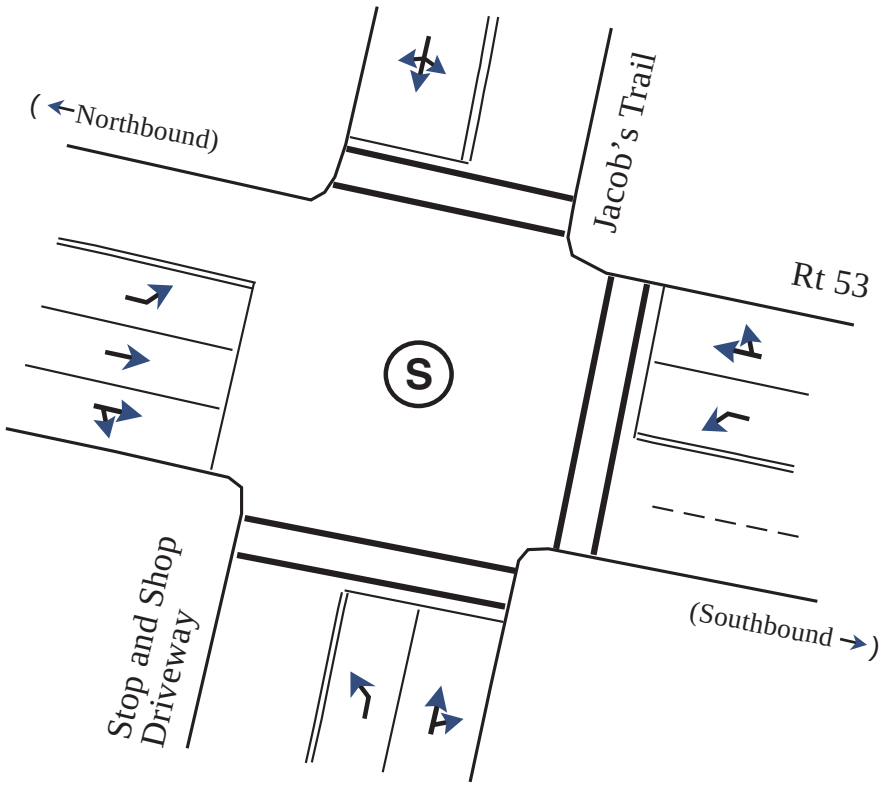
- *A new traffic signal was installed at the Route 53 and Jacob's Trail/Stop and Shop intersection.*
- *Route 53 was widened from the north to include an exclusive left-turn lane to Jacob's Trail, a through lane, and a shared through/right-turn lane to Stop and Shop.*
- *From the south, the improvements include an exclusive left-turn lane to Stop and Shop.*
- *At the driveway exit, an exclusive left-turn lane and a shared through/right-turn lane were built.*
- *An exclusive pedestrian signal phase and crosswalks were installed, as was an LED advanced warning sign from the south stating, "RED Signal Ahead."*
- *A second travel lane on Route 53 southbound was added from the site driveway to the Route 123 intersection in Hanover.*

[30] Vanasse Hangen Brustlin, Inc., "Traffic Impact & Access Study, Stop & Shop Supermarket, Norwell & Hanover, Massachusetts," October 1999.

Previous



Completed



AM (PM) peak hour turning movement volumes
(prior to intersection improvements)

(Not to scale)

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Route 53 Corridor
Transportation Plan

FIGURE C-16
Route 53 at Jacob's Trail/Stop and Shop Driveway (Norwell): Previous Geometric Layout and Completed Stop and Shop-Related Mitigation

- *A secondary access road from the site was constructed, about 240 m (800 ft) west of Route 53, to Route 123 in Hanover.*
- *Improvements were made to the Route 53 at Route 123 intersection, also in Hanover* (see #22 below).

Assessment: The capacity and safety improvements which have been completed on Route 53 as part of the mitigation for the Stop and Shop project will benefit the area. New, post-improvement, LOS analysis data were not available for the Route 53 at Jacob's Trail/site driveway intersection, but projected LOS (for 2004) is C or better during both the PM peak hour and Saturday midday peak hour. The VHB study indicates that the new intersection met signal Warrants 1, 2, 8, 9, and 11.[31]

Additional benefits include the added crosswalks and pedestrian signal phase at the intersection, as well as the advanced warning sign, "RED Signal Ahead." This is an added safety measure for Route 53 vehicles approaching the Jacob's Trail/site driveway intersection from the south.

Hanover

Route 53 (Washington Street; Columbia Road) in Hanover has among the highest traffic volumes in the corridor. The roadway runs 7.1 km (4.4 mi) from the Norwell line to the Pembroke line, has 2-lane, 4-lane, and 5-lane sections, and is under state jurisdiction. It is also the one location in the corridor where Route 53 has an interchange with Route 3. There are seven signalized intersections on Route 53 in Hanover. There is also one flashing beacon, at the Shaw's/CVS/Eastern Bank driveway, just north of Rockland Street (Route 139). Land use is nearly all commercial; however, pockets of residential and recreational uses exist as well (see Figure C-17).

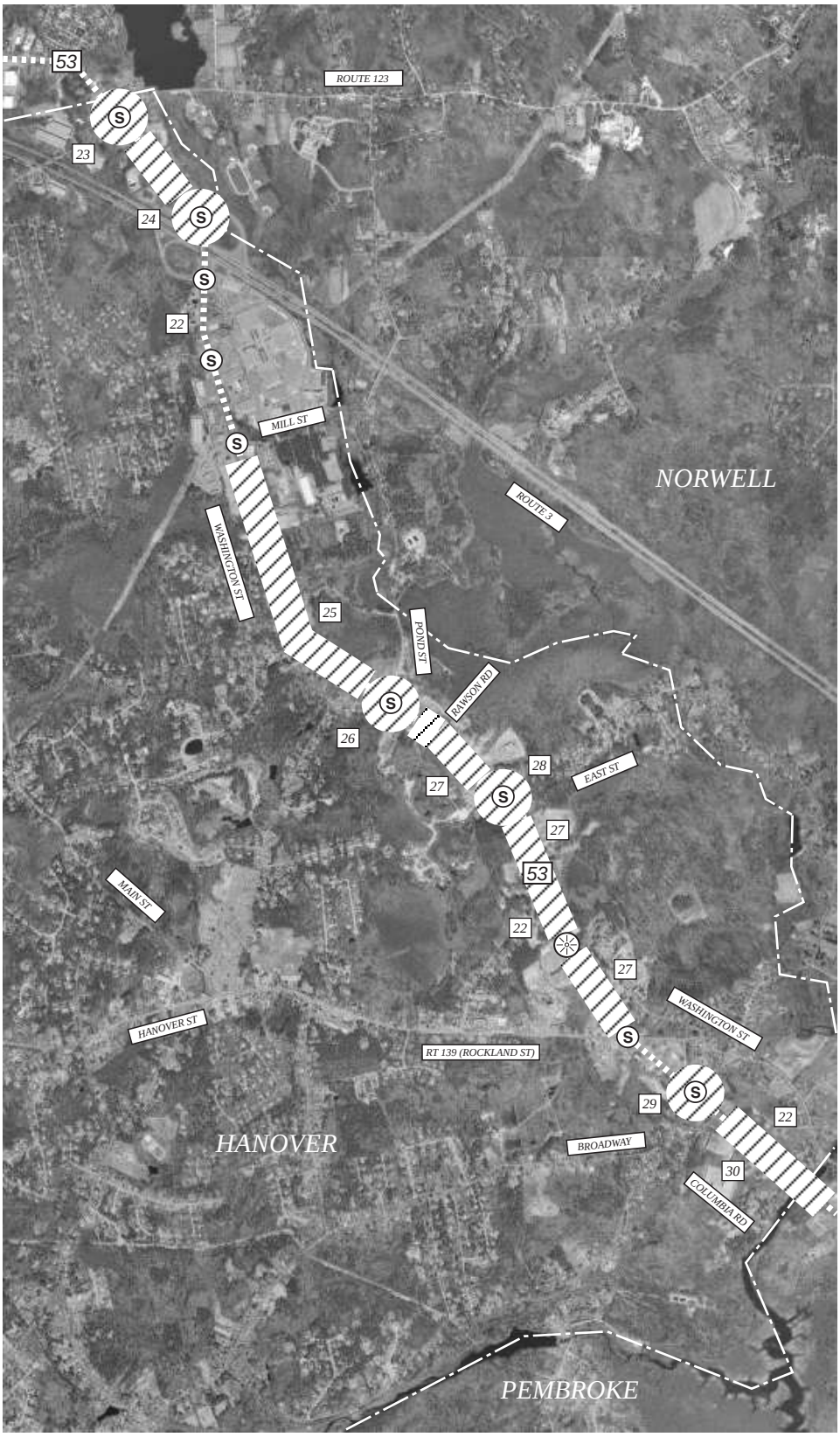
22 ***Route 53 in Hanover:*** *There are inconsistent widths of the striped shoulders on Route 53 throughout Hanover. The widths are: 0.6–1.8 m (2–6 ft) from the Norwell line to Route 3; 0.3–1.2 m (1–4 ft) from Route 3 to Rockland Street; and, 0–0.6 m (0–2 ft) from Rockland Street to the Pembroke line.*

Recommended improvement: *Restripe the lane markings on Route 53 so that, wherever possible, or when future reconstruction of Route 53 occurs, a 2.5 m (8 ft)-wide shoulder is added to both sides of the roadway.*

Assessment: To increase overall safety, as well as to provide space for emergency vehicle operations, MassHighway's Highway Design Manual recommends a minimum of 2.5 m (just over 8 ft)-wide shoulders on roadways classified as Urban Arterials.[32] Route 53 is classified as an Urban Minor Arterial in the northern section and as an Urban Principal Arterial in the southern section of Hanover. There is a minimum of about 18 m (60 ft) of highway layout right-of-way on Route 53.

[31] Ibid., p. 47.

[32] The Commonwealth of Massachusetts, op. cit., p. 5.02.0.



LOCATIONS OF TRANSPORTATION IMPROVEMENTS:

22 If possible, add striped 2.5 m (8 ft) shoulders on both sides in two sections of Route 53 in Hanover. Striped shoulders currently exist in varying widths: 0–1.8 m (0–6 ft) (refer to p. 41).

23 Signal upgrade and capacity improvements were completed during 2002 at Route 53 at Route 123 (Webster St) (refer to p. 43 and Figure C-18).

24 Widen Route 53 to a three- or four-lane cross section. Widen intersection and add a new signal at the Route 53 at Route 3 ramps (refer to p. 45 and Figures C-19, C-20).

25 Widen Route 53 to a five-lane cross section. Add a sidewalk on the northbound side (refer to p. 48 and Figure C-21).

26 Signal upgrade and capacity improvements at Route 53 at Old Washington St (refer to p. 50 and Figure C-22).

27 Widen Route 53 to four travel lanes and a wide median for left-turn lanes and U-turns. Continue planned sidewalk from #25 (refer to p. 52 and Figure C-23).

28 Install a new traffic signal and widen intersection at Route 53 at East St (refer to p. 54 and Figure C-24).

29 Widen three approaches and add lanes at the Route 53 at Broadway intersection (refer to p. 56 and Figure C-25).

30 Widen Route 53 to four travel lanes. Add a sidewalk on the northbound side (refer to p. 59 and Figure C-26).

CTPS

Route 53 Corridor Transportation Plan

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Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE C-17
Hanover: Route 53 Layout and Locations of Transportation Improvements

23 ***Route 53 at Route 123 (Webster Street):*** *This intersection was reconstructed during 2002 as part of the mitigation for the Stop and Shop supermarket project at Jacob's Trail in Norwell.*

Information regarding this development is based on the same VHB traffic study that discussed the Stop and Shop project.[33]

Completed improvements:

- *An upgraded traffic signal. Although exclusive left-turn lanes were not incorporated into the new intersection design, the phasing scheme includes leading phases on the northbound and westbound approaches to better accommodate the higher numbers of left turns. In addition, the signal phasing scheme includes concurrent pedestrian phasing.*
- *Geometric improvements on all approaches. The intersection has been widened to include two approach lanes and two receiving lanes on all four legs. There is also an exclusive right-turn lane on the Route 53 southbound approach* (see Figure C-18).
- *A secondary access road from the Stop and Shop site to Route 123 in Hanover was constructed about 800 ft west of Route 53.*

Assessment: The improvements should benefit the intersection by reducing vehicle crashes. Since the recorded crash data showed a preponderance of angle crashes, the leading left-turn phases should help to reduce the incidence of this type of collisions.

The added capacity in the form of new travel lanes should improve intersection LOS. Although there are not yet any LOS analysis data available since the recent improvements were done, projected LOS (for 2004) shows an improvement from F to D or better during both the PM peak hour and Saturday midday peak hour (see the summary table below). The added sidewalks and concurrent pedestrian signal phase are safety benefits for local employees and residents.

Route 53 at Route 123 (Webster Street) Intersection Summary:

- Intersection LOS data:

	PM Peak Hour			Saturday Midday		
Scenario	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)
1999	F	*	N.A.	F	*	N.A.
2004 No-Build	F	*	>160	F	*	>160
2004 Build	C	24	77	D	31	92

- Jurisdiction over improvements: MassHighway

Source: Vanasse Hangen Brustlin, Inc., Watertown, MA, 1999.
* = 80 or more seconds total delay for signalized intersections, 50 or more seconds for unsignalized intersections.
Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

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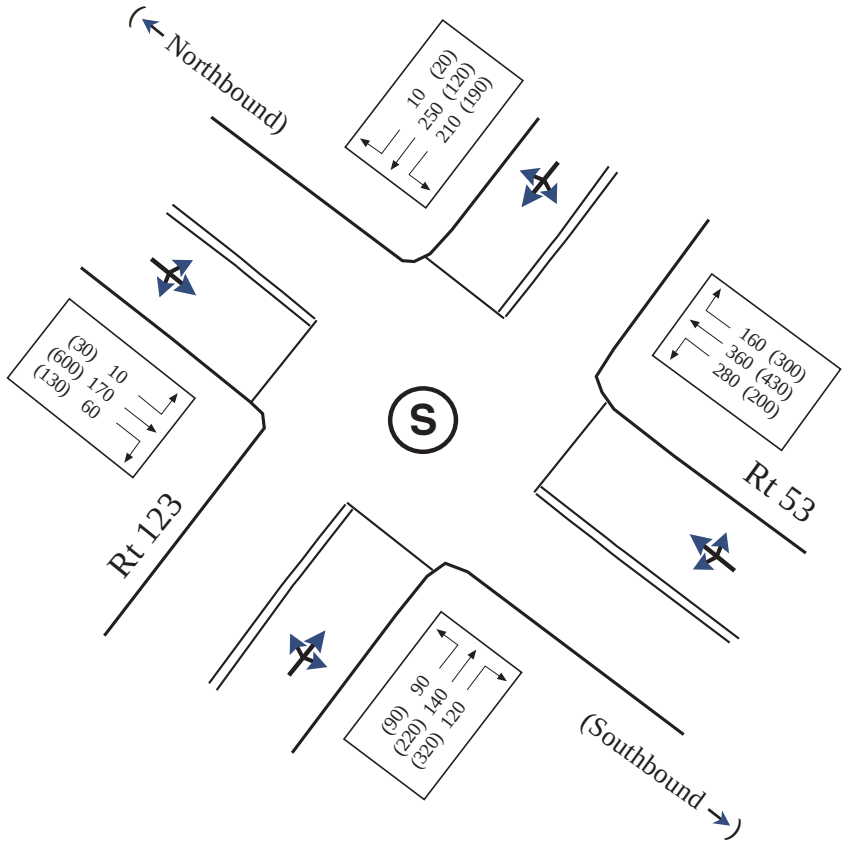
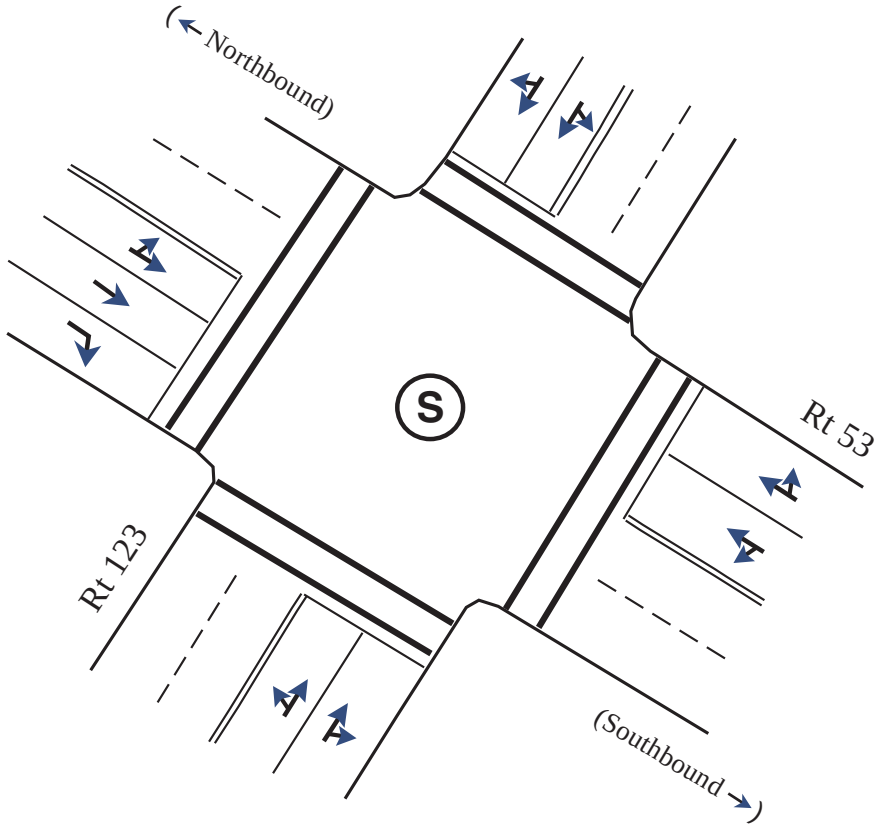
[33] VHB, 1999, op. cit., pp. 48–50.

Previous



AM (PM) peak hour turning movement volumes
(prior to intersection improvements)

Completed



(Not to scale)

CTPS

Route 53 Corridor
Transportation Plan

FIGURE C-18
Route 53 at Route 123 (Hanover):
Previous Geometric Layout and Recently (2002)
Completed Stop and Shop–Related Mitigation

24 ***Route 53 from Route 123 to Route 3:*** *As a final part of the mitigation for the Stop and Shop project in Norwell, the proponent made suggestions about how to improve this section of Route 53. These are discussed below.*

The proponent was not required to present official, final recommendations for improving this short section of Route 53, which is just over one-half of a kilometer (one-third of a mile) in length. Instead, suggested transportation improvements to reduce congestion and improve traffic operations were presented for the Town of Hanover's consideration; the town is not required to implement these changes. The suggested improvements are discussed in a Functional Design Report by VHB.[34]

Considered improvements suggested by the VHB report:

- *That a three-lane cross section be considered for the section of Route 53 between Route 123 and Route 3. This would include one 11 ft travel lane in each direction, a 14 ft two-way center left-turn lane, and 4 ft shoulders and sidewalks on both sides* (see Figure C-19).
- *Alternatively, that an undivided four-lane cross section be considered for the entire section length. This would include two 11 ft travel lanes in each direction, and 4 ft shoulders and sidewalks on both sides.*
- *Also, that a new traffic signal and widening of the intersection of Route 53 at the Route 3 northbound ramps be considered* (see Figure C-20).

Assessment: One benefit from a widened three-lane cross section between Route 123 and Route 3 is the ability of left-turning vehicles to maneuver more safely without blocking through vehicles. Other benefits include minimal right-of-way impacts on commercial abutters, and the fact that it is somewhat less costly to construct than the four-lane cross section. However, while the three-lane alternative would initially improve congestion levels, because of the anticipated increase in traffic growth, it appears that the benefit has limited longevity (based on 2012 volumes).

Additionally, the same caveat also exists in this section as for the section in Norwell, discussed earlier with respect to adding a center left-turn lane between Queen Anne's Corner and Grove Street/High Street (#18 above). As in Norwell, daily volumes in this section are also about twice as high as the upper end of the recommended range (5,000–12,000 vehicles per day), as described in MassHighway's Highway Design Manual.[35]

The four-lane alternative is costlier than the three-lane cross section, has a greater impact on abutting businesses, and would provide less protection, as well as an additional lane to cross, for left-turning vehicles. The major benefit would be that future traffic volumes (year 2012) would still be processed satisfactorily, operating at LOS C or better. Since a two-way center left-turn lane in this section may not be appropriate given the high existing traffic volumes, this plan recommends the four-lane cross section alternative.

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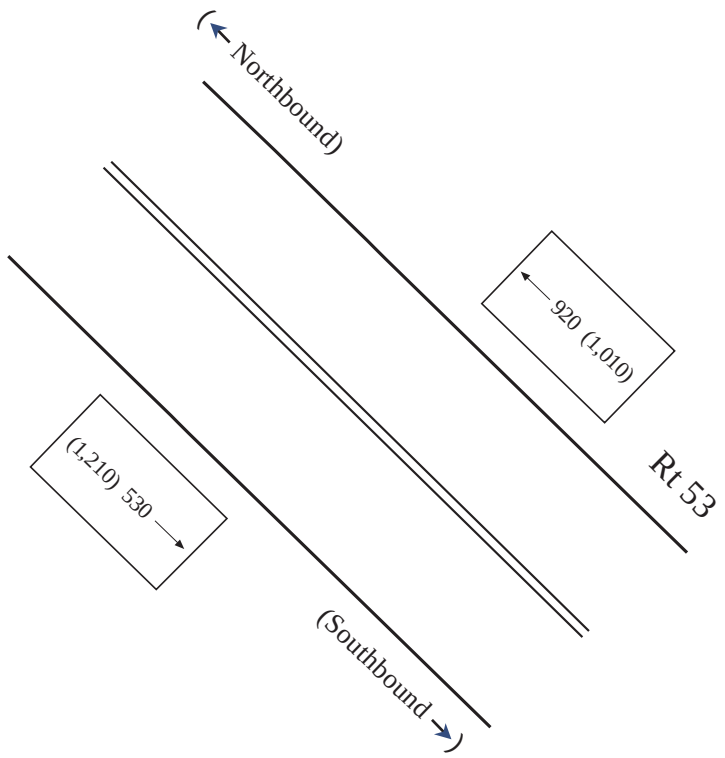
[34] Vanasse Hangen Brustlin, "Functional Design Report, Washington Street (Route 53), Webster Street (Route 123) to Route 3, Hanover, MA," July 2002.

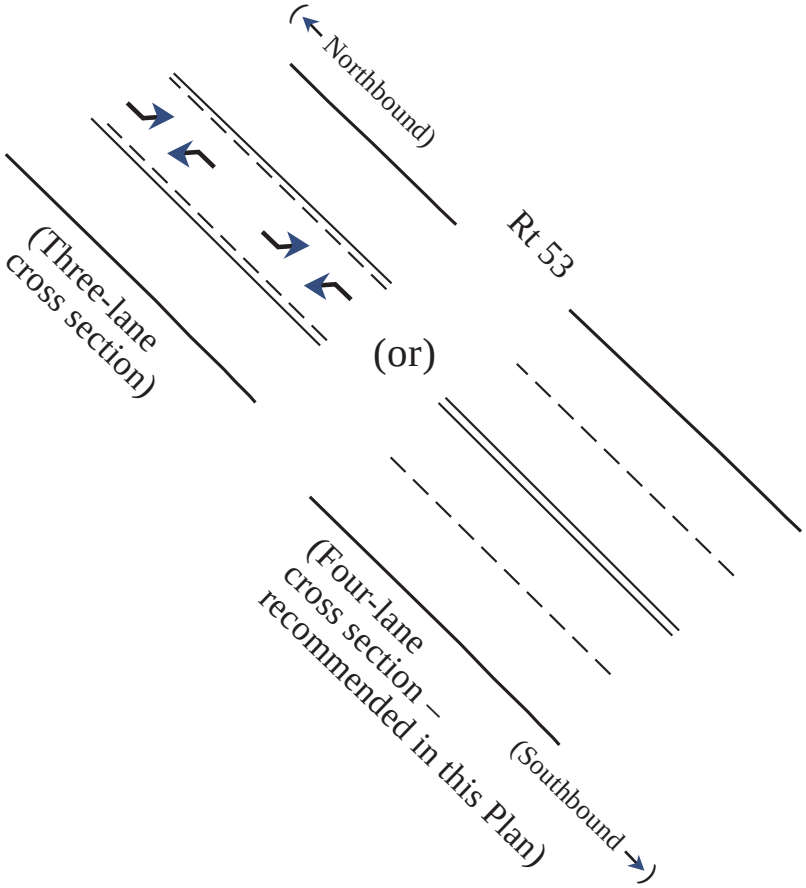
[35] MassHighway, 1997, op. cit., p. 7.60.0.

Existing



Existing highway layout and AM (PM) peak hour volumes

Considered



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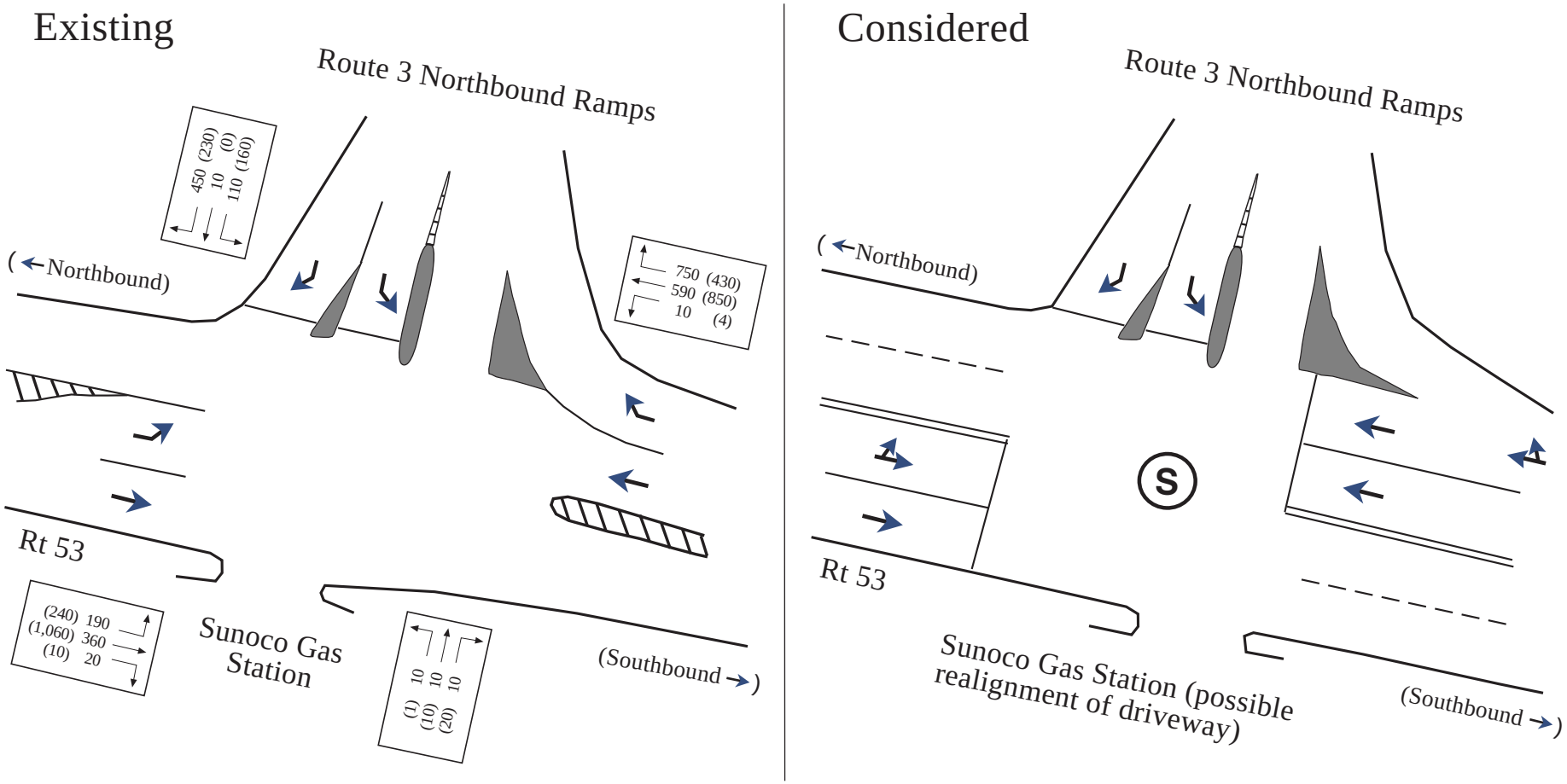
CTPS

Route 53 Corridor Transportation Plan

FIGURE C-19
Route 53 between Route 123 and Route 3 (Hanover): Existing Geometric Layout and Considered Transportation Improvements



Existing intersection layout and AM (PM) peak hour turning movement volumes

(Not to scale)

CTPS

Route 53 Corridor Transportation Plan

FIGURE C-20
Route 53 at the Route 3 Northbound Ramps (Hanover): Existing Geometric Layout and Considered Transportation Improvements

The VHB report states that a traffic signal at Route 53 at the Route 3 northbound ramps meets the necessary signal warrants. A new signal would allow for safe turning movements to and from the ramp, while improving operational LOS. The analysis showed a projected improvement in intersection LOS from F during both the AM and PM peak hours (unsignalized), to D in the AM peak hour and C in the PM peak hour (signalized). This assumes traffic volumes for the year 2012.

A test was performed by CTPS in order to try to improve upon LOS D in the AM peak hour, given the proposed geometry seen in Figure C-20. By adding a second right-turn lane from the Route 3 northbound ramps, LOS improved from D to B in the AM peak hour, and in the PM peak hour from C, 24 seconds delay, to C, 22 seconds delay.

Additionally, due to its proximity to the traffic signals at Route 53/Route 123 and Route 53 at the Route 3 southbound ramps, to the north and to the south, respectively, signal coordination would likely be considered in the design stage. Restriping of the lanes on the bridge across Route 3 from three to four lanes would also be likely. The bridge currently measures 13.4 m (44 ft) in width, and the proposed restriping could either be four 3.2 m (10.5 ft) lanes with two 0.3 m (1 ft) shoulders, or four 3.35 m (11 ft) lanes with no shoulders.[36]

25 ***Route 53 from Mill Street to Rawson Road:*** *The planned improvements in this section of Route 53 are essentially a continuation of the roadway widening which was implemented to the north between Route 3 and Mill Street in the early 1990s.*

The improvements are long-range, and are listed in the "Supplemental List of Projects" section of the 2004 TIP. Figure C-21 shows the existing and planned cross sections.[37]

Planned improvements:

- *Widen Route 53 south of Mill Street to north of Rawson Road, just under 1.6 km (1.0 mi) in length. The widening would be from one 3.7 m (12 ft)-wide travel lane and a 1.2 m (4 ft) shoulder in each direction to two 3.7 m lanes and a 0.6 m (2 ft) shoulder in each direction. Additionally, there would be a 4.3 m (14 ft)-wide two-way center left-turn lane constructed.*
- *Construct a 1.8 m (6 ft)-wide sidewalk on the northbound side of Route 53.*

Assessment: The project's Draft Environmental Impact Report (DEIR) and Final Environmental Impact Report (FEIR) state that with the widening project, operational LOS on the section between Mill Street and Rawson Road would improve from LOS E to C in the AM peak hour, and from LOS F to E during the PM peak hour (based on projected 2016 volumes).[38]

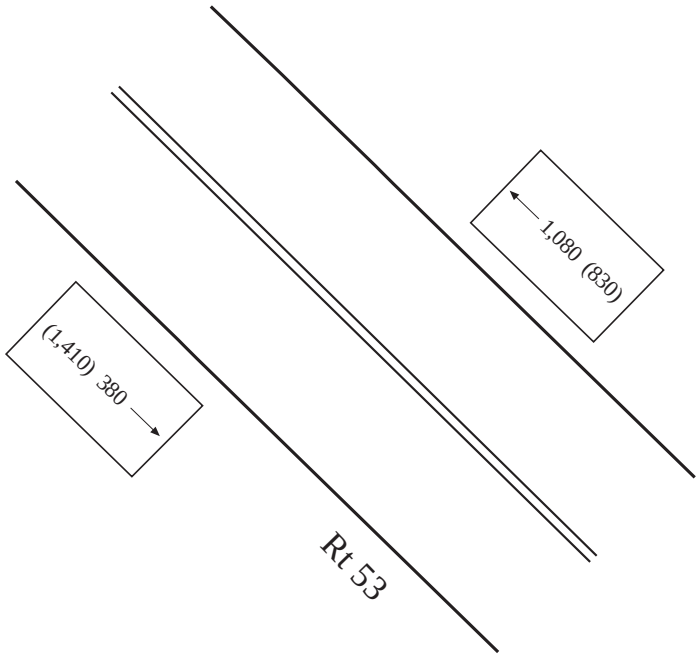
The planned two-way center left-turn lane would increase safety for drivers by creating a storage area for traffic turning left into abutting commercial establishments. This has the effect of

[36] VHB, Inc., 2002, op. cit., p. 18.

[37] Boston MPO, op. cit., p. A-11.

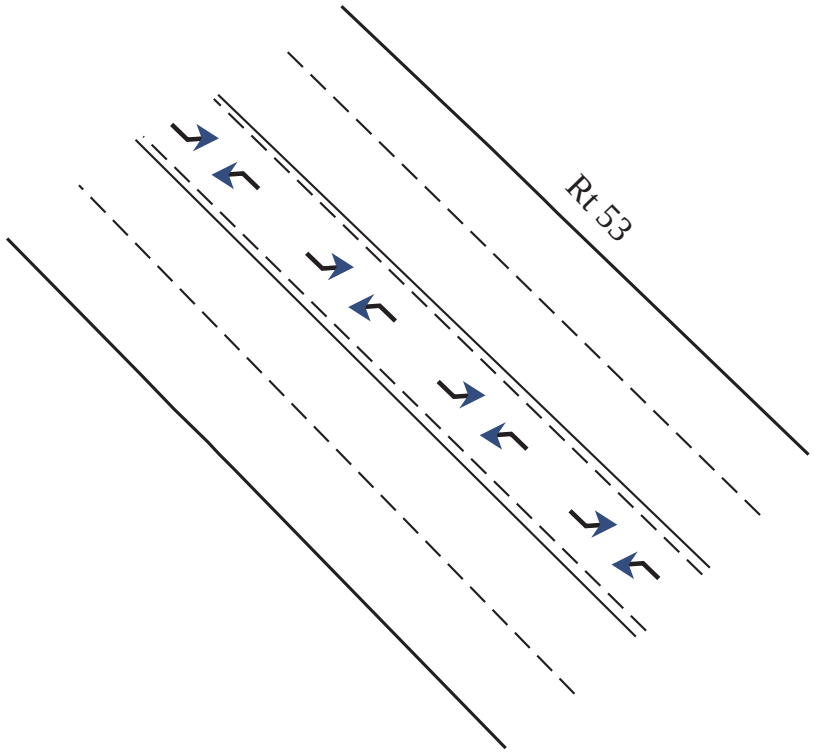
[38] Massachusetts Highway Department, "Draft Environmental Impact Report – EOEA # 10343, Proposed Route 53 Phase 1B Transportation Improvements Project, Hanover, MA," March 1998, and "Final Environmental Impact Report – EOEA # 10343, Proposed Route 53 Phase 1B Transportation Improvements Project, Hanover, MA," November 1998.

Existing



Existing highway layout and AM (PM) peak hour volumes

Planned



(Not to scale)

CTPS

Route 53 Corridor Transportation Plan

FIGURE C-21
Route 53 between Mill Street and Rawson Road (Hanover): Existing Geometric Layout and Planned Transportation Improvements

eliminating any blocking of through traffic by removing all left-turning vehicles from the through lanes.

The planned improvements include enhanced protection for pedestrians with the addition of a sidewalk on the Route 53 northbound side. It would, of course, be of even greater benefit if this sidewalk were linked to an existing sidewalk to the north or south on Route 53. The closest sidewalk is at the Route 53/Route 123 intersection, about 2.1 km (1.3 mi) to the north, and just north of Rockland Street (Route 139) in Hanover, located about 1.9 km (1.2 mi) south of Rawson Road. This plan therefore recommends that the planned sidewalk be extended further north, in front of the Hanover Mall, over the Route 3 bridge, and be connected with the existing northbound sidewalk at Route 123.

Finally, it is recommended that since land use in this section of Route 53 may undergo development in the future, the Town of Hanover should require that service roads or connectors between adjacent commercial properties be considered in the design stage. The existence of connectors helps to make future increases in local traffic more manageable by potentially consolidating driveways. It is also easier to build connectors during construction, rather than trying to retrofit the properties after developments have been completed.

26 ***Route 53 at Old Washington Street:*** *One intersection in the planned five-lane cross section is scheduled for improvement, Route 53 at Old Washington Street, located at the southern end of the project area.*

This is a long-range improvement, and the information is based on the same DEIR and FEIR as for the planned five-lane cross section project discussed above (see #25).[39]

Planned improvements:

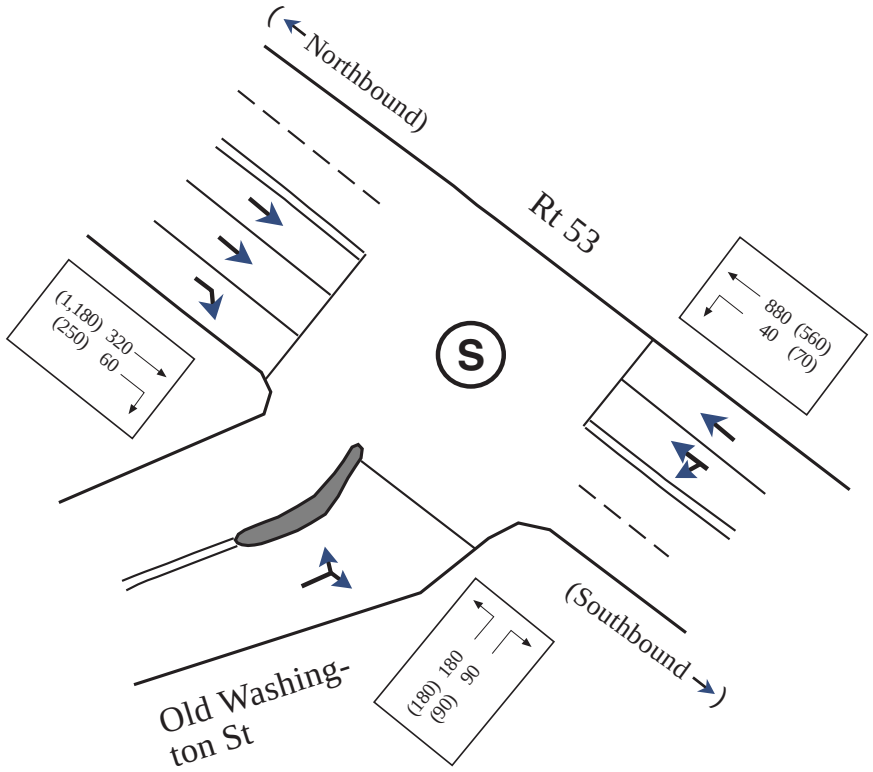
The improvements would occur at the Route 53/Old Washington Street intersection, about 60 m (200 ft) north of Pond Street, which in turn is located just over 180 m (600 ft) north of Rawson Road. See Figure C-22 for all existing and planned geometrics.

- *Move the Pond Street approach to Route 53 north so it aligns with Old Washington Street, creating a four-legged intersection with an upgraded traffic signal.*
- *Create new through lanes on Route 53 at the intersection, continuing the planned five-lane cross section from the north, as well as a new exclusive right-turn lane eastbound on Old Washington Street. Pond Street would continue to be an approach with one general purpose lane.*

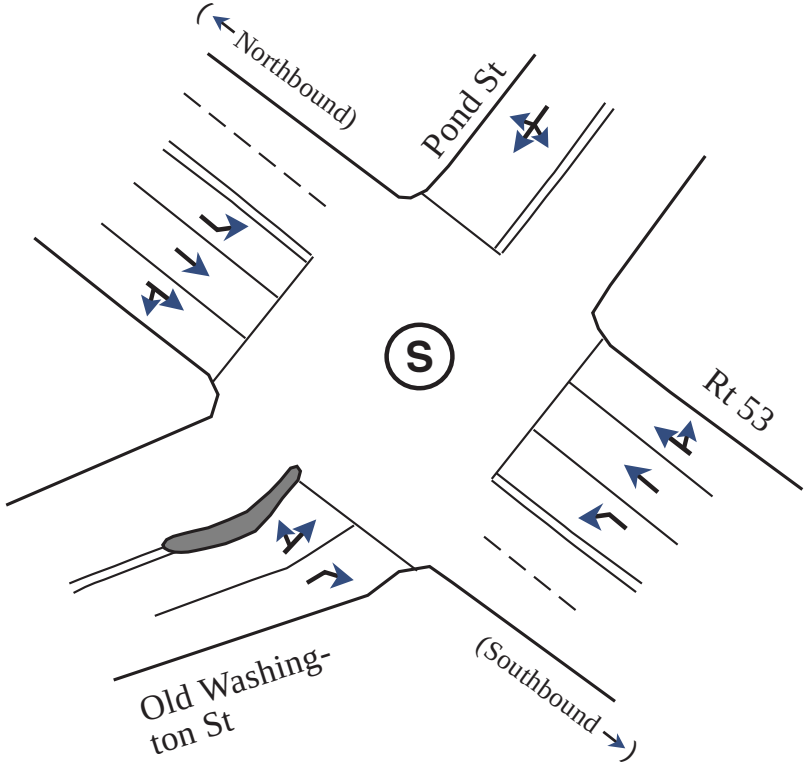
Assessment: With the planned improvements, operational LOS at the Route 53 at Old Washington Street intersection is projected to improve from LOS F to B in both the AM and PM peak hours (see summary table on page 52). The relocation of the Pond Street approach to a site opposite Old Washington Street consolidates two side streets into one signalized intersection with Route 53. Pond Street currently is not a through street; it ends a few hundred feet east of Route 53. However, the truck depot for the Hanover Department of Public Works is located at the end of Pond Street, and the realignment creates a safer entry/exit point for local truck traffic.

[39] Massachusetts Highway Department, 1998, op. cit.

Existing



Planned



Existing intersection layout and AM (PM) peak hour turning movement volumes

(Not to scale)

CTPS

Route 53 Corridor Transportation Plan

FIGURE C-22
Route 53 at Old Washington Street (Hanover): Existing Geometric Layout and Planned Transportation Improvements

Route 53 at Old Washington Street Intersection Summary:

- Intersection LOS data:

Scenario		AM Peak Hour LOS	AM Peak Hour Intersection Delay (sec.)	AM Peak Hour Total Avg. Queue (# veh.)	PM Peak Hour LOS	PM Peak Hour Intersection Delay (sec.)	PM Peak Hour Total Avg. Queue (# veh.)
1996		B	10	23	F	*	70
2016	No-Build	F	*	43	F	*	127
2016	Build	B	6	18	B	8	39

- Jurisdiction over improvements: MassHighway

Source: Massachusetts Highway Department, 1998.
* = 80 or more seconds total delay for signalized intersections, 50 or more seconds for unsignalized intersections.
Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

There is some lack of clarity with respect to the intersection design as shown in the FEIR Appendices. Old Washington Street eastbound currently has one travel lane, which widens near Route 53 to accommodate a few vehicles, side by side, turning left or right. The LOS analysis calls this a one-lane approach. The planned improvements include an exclusive right-turn lane on this approach, and the LOS analysis shows the operational benefits of this improvement as based on two lanes. However, the designs included in the report merely depict the same flared approach as currently exists, a 7.3 m (24 ft)-wide eastbound lane, both before and after the improvements.

27 ***Route 53 from Rawson Road to Rockland Street (Route 139):*** *This section is a two-lane roadway and experiences some of the highest traffic volumes in the Route 53 corridor.*

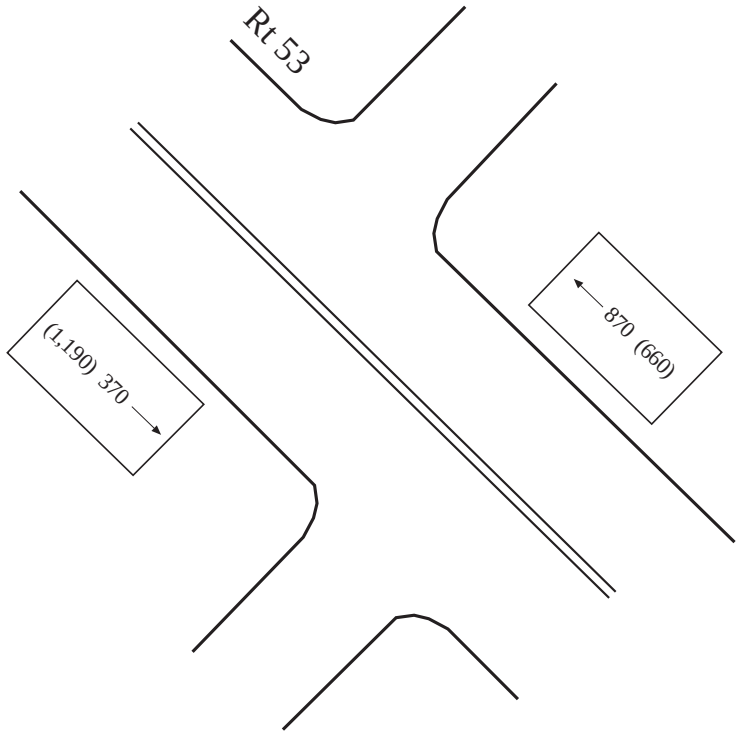
Recommended improvements (see Figure C-23):

- *Widen Route 53 south of Rawson Road to Rockland Street, a distance of about 1.9 km (1.2 mi). The widening would be from one travel lane in each direction to two 3.7 m (12 ft) lanes and a 0.6 m (2 ft) shoulder in each direction. Additionally, there would be a 4.3 m (14 ft)-wide unpaved median which would include exclusive left-turn lanes and/or U-turn openings at selected locations.*
- *Construct a 1.8 m (6 ft)-wide sidewalk on the northbound side of Route 53 from Rawson Road to Rockland Street.*

Assessment: The widening of this section of Route 53 would be a continuation of the roadway widening which is planned to the north between Mill Street and Rawson Road (see #25 above).

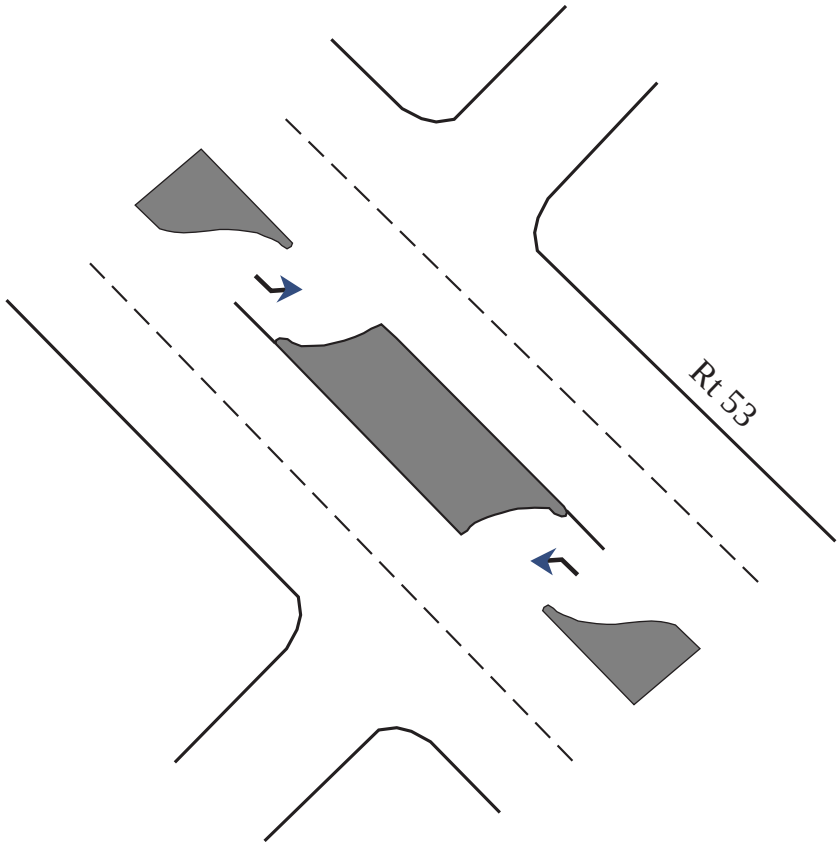
The section of Route 53 between Route 3 in Hanover and Schooset Street (Route 139) in Pembroke has the highest sustained daily traffic volumes over the longest distance in the corridor. Volumes are consistently in the range of 26,000 to 30,000 vehicles per day over a distance of 6.9 km (4.3 mi). The abutting land is zoned as business/commercial/limited industrial/planned shopping center, and the roadway is functionally classified as Urban Principal Arterial. Only a very small portion is zoned as residential.

Existing



Existing highway layout and AM (PM) peak hour volumes

Recommended



(Not to scale)

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Route 53 Corridor Transportation Plan

FIGURE C-23
Route 53 between Rawson Road and Rockland Street (Route 139) (Hanover): Existing Geometric Layout and Recommended Transportation Improvements

Of the 6.9 km (4.3 mi) between Route 3 and Schooset Street:

- 4.0 km (2.5 mi) of the roadway currently has a five-lane cross section (including a two-way center left-turn lane), or is planned to become a five-lane cross section.
- 0.5 km (0.3 mi) of the roadway currently has sidewalks on at least one side.

Land use and traffic volumes are similar in the already planned five-lane section, Mill Street to Rawson Road, and the section from Rawson Road to Rockland Street. This plan therefore recommends that, as a next step, the widening of Route 53 from two to four travel lanes as far south as Rockland Street makes inherent sense. This would create a Route 53 facility with four travel lanes through one of the most commercially developed sections in the corridor, with enhanced capacity, and with close access to Route 3 (Exits 12 and 13), giving it enough roadway capacity to accommodate continued growth in the area.

As mentioned in #25 above, this plan recommends that the Town of Hanover require, whenever possible, service roads or connectors between adjacent commercial properties when considering future development along Route 53. The benefits include better management of traffic between Route 53 and abutting developments. It is also easier to include the connectors during the design stage, rather than trying to retrofit properties after developments have been completed.

28 ***Route 53 at East Street:*** *There are problematic traffic operations at this location.*

The main issue appears to be:

- It is difficult for vehicles on the minor approach (East Street) to enter Route 53, particularly for left-turning vehicles during the PM peak period.

Recommended improvements:

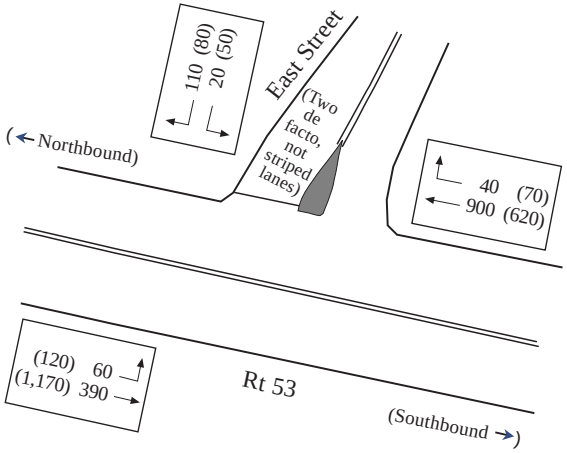
- *Install a new traffic signal at this intersection, including an exclusive pedestrian phase.*
- *Build Alternative 2: Add a second travel lane on Route 53 northbound and southbound.*
- *Add loop detectors, signs, and markings for bicyclists.*

MassHighway has jurisdiction at this location, and these elements (Build Alternative 2) would be long-range improvements (see Figure C-24).

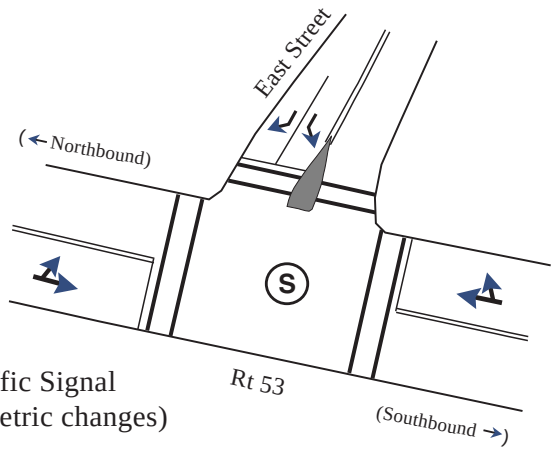
Assessment: The location meets four of eight warrants for traffic-control signal installation: Warrants 1 (Eight-Hour Vehicular Volume), 2 (Four-Hour Vehicular Volume), 3 (Peak Hour), and 8 (Roadway Network). It does not meet Warrant 7 (Crash Experience), and was not tested for Warrants 4 (Pedestrian Volume), 5 (School Crossing), or 6 (Coordinated Signal System).[40]

The addition of a signal would improve traffic operations, particularly for vehicles from East Street entering Route 53. The summary table on page 56 describes the improvements in operational LOS when the intersection is changed from unsignalized to signalized. When a

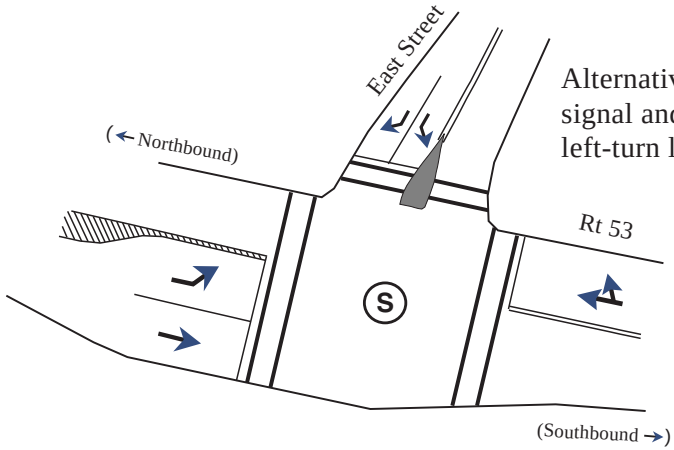
[40] Federal Highway Administration, MUTCD, op. cit., p. 4C-1.



Existing intersection layout and AM (PM) peak hour turning movement volumes

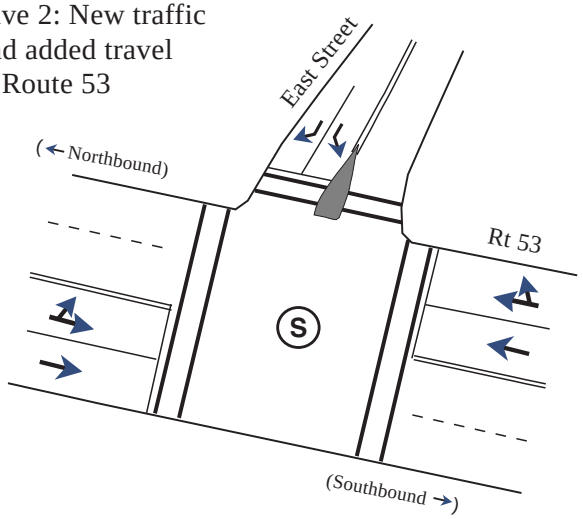


New Traffic Signal (no geometric changes)



Alternative 1: New traffic signal and a southbound left-turn lane

Alternative 2: New traffic signal and added travel lanes on Route 53



(Not to scale)

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Route 53 Corridor Transportation Plan

FIGURE C-24
Route 53 at East Street (Hanover):
Intersection Improvement Alternatives Analyzed

southbound left-turn lane or a second travel lane on Route 53 is added, as part of the recommended improvements from #27 above, the benefits are even greater.

The summary table also shows that vehicle crashes do not currently appear to be a problem. The crash rate of 0.43 crashes per million vehicles is well below the District 5 average of 0.61 for unsignalized intersections.

Route 53 at East Street Intersection Summary:

- Intersection LOS data: Unsignalized

Scenario		AM Peak Hour: LOS / Delay			PM Peak Hour: LOS / Delay		
		SB lefts, throughs	WB lefts	WB rights	SB lefts, throughs	WB lefts	WB rights
2000	Existing	B / 11	E / 40	C / 23	A / 10	F / *	B / 15
2005	No-Build	B / 11	E / 46	D / 25	A / 10	F / *	C / 15
2025	No-Build	B / 13	F / *	E / 49	B / 11	F / *	C / 19

- Number of vehicle crashes, 1996–1998 (Mass. Registry): 11 (3.7 per year)
- Crash rate: 0.43 crashes per million entering vehicles (District 5 average: 0.61)
- Jurisdiction over improvements: MassHighway

- Intersection LOS data: Signalized *(recommended improvement, Build Alternative 2)*

Scenario		AM Peak Hour			PM Peak Hour		
		LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)
2005	New Signal	C	31	45	F	*	118
	Build Alt. 1	C	29	42	C	26	73
	Build Alt. 2	B	16	16	C	24	37
2025	New Signal	E	64	80	F	*	>160
	Build Alt. 1	E	59	73	E	68	119
	Build Alt. 2	B	19	22	E	68	56

* = 80 or more seconds total delay for signalized intersections, 50 or more seconds for unsignalized intersections.
Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

---

29 ***Route 53 at Broadway:*** *There are problematic traffic operations at this location.*

The concerns can be further specified as:

- Congestion and overall intersection delay (LOS F), mostly during the PM peak period.
- The heavy left-turn movement from Broadway eastbound operates at LOS F during the AM peak hour.
- Of the 20 crashes recorded by the Hanover police at this location between 1998 and 2000, nearly half involved vehicles turning left onto Broadway from Route 53 colliding with opposing Route 53 through traffic (see Table B-15 and Figure B-8 in Appendix B).

- Although the Broadway eastbound and westbound approaches are striped as one general purpose lane each, they function as a de facto left-turn/through lane and a through/right-turn lane eastbound, and as a left-turn/through lane and an exclusive right-turn lane westbound, respectively.

Recommended improvements *(Build Alternative 3, Concurrent Pedestrian Phasing):*

- *Widen Route 53 southbound by adding an exclusive right-turn lane (about 45 m, or 150 ft, in length). This would create a five-lane cross section.*
- *Widen Broadway to a four-lane cross section eastbound, and a three-lane cross section westbound. This would result in an exclusive left-turn lane, a through lane, and an exclusive right-turn lane (30 m, or 100 ft, in length) eastbound, and an exclusive left-turn lane (30 m, or 100 ft, in length) and a shared through/right-turn lane westbound, respectively.*
- *The signal phasing would vary between the AM and PM peak periods. There would be four phases in the AM: leading eastbound, eastbound/westbound, leading northbound, and northbound/southbound. In the PM there would be three phases: eastbound/westbound, leading northbound, and northbound/southbound. The pedestrian phase would not be exclusive, but would be concurrent with the eastbound/westbound and northbound/ southbound signal phases.*
- *Increase the all-red clearance interval from one to two seconds.*
- *Investigate whether it is possible for the bank driveway on Broadway that is further west from Route 53 to be modified to provide for both entering and exiting vehicles, allowing closure of the driveway that is nearer to the intersection.*
- *Add loop detectors, signs, and markings for bicyclists.*

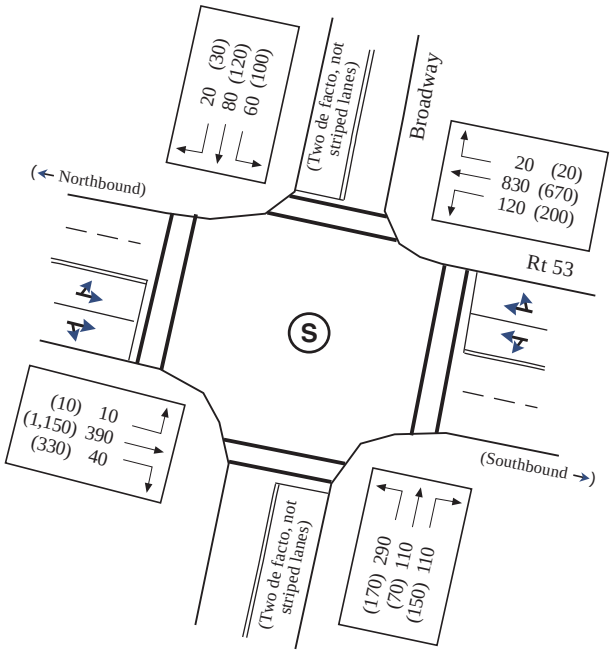
These improvements would be long-range, and would be under the jurisdiction of MassHighway and the Town of Hanover (see Figure C-25).

Assessment: This intersection was analyzed as part of a previous CTPS study. The improvements recommended in this plan are based in part on the results of that study.[41]

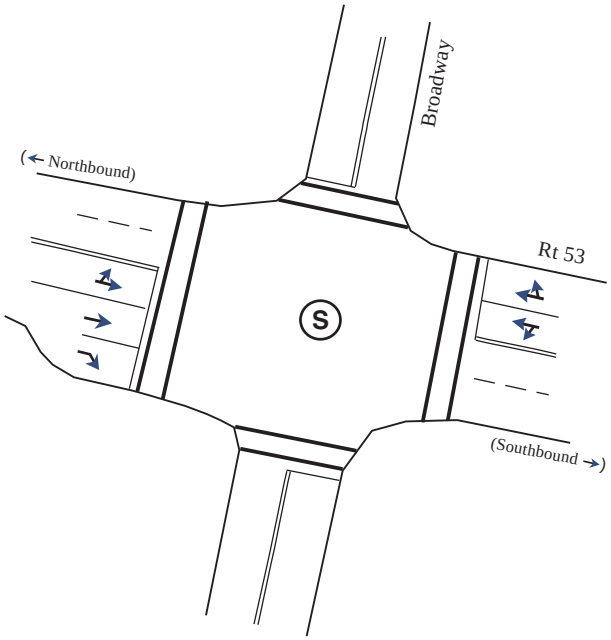
As shown in Figure C-25 and in the summary table on page 59, numerous alternatives were analyzed and tested for operational LOS, with and without an exclusive pedestrian phase. The intersection currently operates with an exclusive pedestrian phase. The table shows that only in Build Alternative 3, with concurrent pedestrian phasing (the recommended alternative), does the overall intersection operate at LOS C and D in the 2005 AM and PM peak hours, respectively. However, even with the change to a concurrent pedestrian phase, by 2025 traffic has grown so that the intersection again operates at LOS F, albeit with somewhat reduced estimated queues than if the exclusive pedestrian phase remained.

It should be added that it is difficult to balance appropriate capacity improvements with safety improvements at this intersection. Although not a perfect solution, given the physical expansion constraints, the recommended improvements nevertheless add new turning lanes, increase the proportion of green time for the numerous left turns from Broadway eastbound

[41] A. Chagari and R. Sievert, "Congested Signalized Intersection Study in the SSC Subregion," CTPS technical memorandum, October 29, 2001.

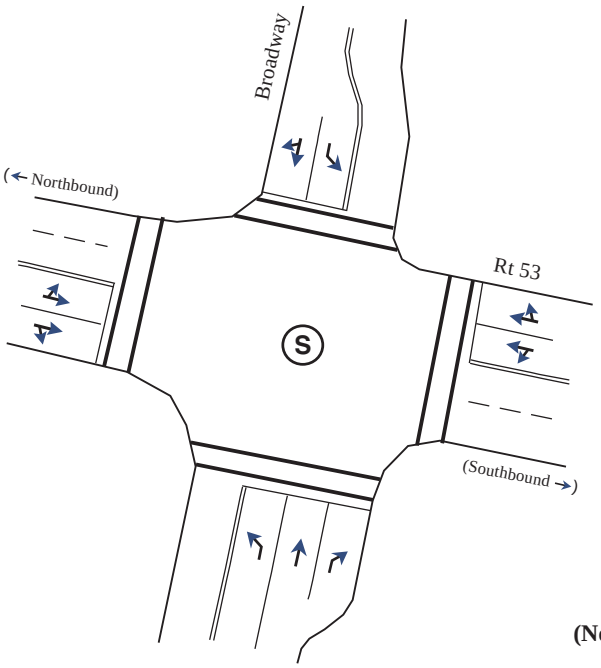


Existing intersection layout and AM (PM) peak hour turning movement volumes

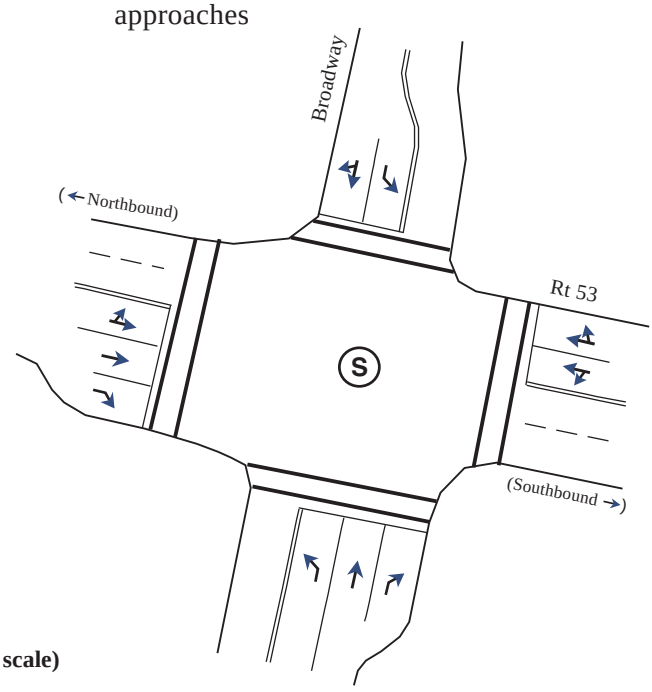


Alternative 1: Add an exclusive right-turn lane southbound

Alternative 2: Widen the two Broadway approaches



Alternative 3: Add an exclusive right-turn lane southbound, widen the two Broadway approaches



(Not to scale)

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Route 53 Corridor Transportation Plan

FIGURE C-25
Route 53 at Broadway (Hanover):
Intersection Improvement Alternatives Analyzed

in the AM peak hour, and increase safety through the addition of a two-second all-red clearance interval.

The recommended widening of Route 53 southbound, and of both the eastbound and westbound Broadway approaches, is likely to involve land takings on the northwest and southwest corners of the intersection (Sylvester Co. and Abington Savings Bank, respectively). However, the takings do appear to be feasible, as well as necessary, in order to improve traffic operations, reduce congestion, and improve safety at the intersection.

Route 53 at Broadway Intersection Summary:

- Intersection LOS data *(recommended improvement, Build Alternative 3, Concurrent Pedestrian Phase)*:

	AM Peak Hour			PM Peak Hour		
Scenario	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)
2000 Existing	E	68	58	F	*	>160
Signal Adj't	D	43	49	F	*	>160
Concurrent Ped Phase	C	24	30	F	*	111
2005 Signal Adj't	D	47	54	F	*	>160
Build Alt. 1	D	43	51	F	*	>160
Build Alt. 2	D	43	46	F	*	>160
Build Alt. 3	D	41	39	F	*	129
Concurrent Ped Phase	C	23	25	D	39	66
2025 Signal Adj't	F	*	88	F	*	>160
Build Alt. 1	F	84	83	F	*	>160
Build Alt. 2	E	80	72	F	*	>160
Build Alt. 3	E	70	65	F	*	156
Concurrent Ped Phase	C	32	38	F	*	140

- Number of vehicle crashes, 1998–2000 (Hanover police): 20 (6.7 per year)
- Crash rate: 0.55 crashes per million entering vehicles (District 5 average: 0.85)
- Jurisdiction over improvements: MassHighway

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* = 80 or more seconds total delay for signalized intersections, 50 or more seconds for unsignalized intersections.
Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

Hanover/Pembroke

30 ***Route 53 from Broadway (Hanover) to Schooset Street (Pembroke):*** *This section is mostly a two-lane roadway and experiences some of the highest traffic volumes in the Route 53 corridor.*

Recommended improvements:

- *Widen Route 53 south of Broadway in Hanover to Schooset Street in Pembroke, a distance of about 1.1 km (0.7 mi). The widening would be from one travel lane in each direction to two 3.7 m (12 ft) lanes and a 2.5 m (8 ft) shoulder in each direction. The widening would also*

include the bridge over the North River, which is the boundary between Hanover and Pembroke.

- *Construct a 1.8 m (6 ft)-wide sidewalk on the northbound side of Route 53 from just south of Schooset Street to just south of Rockland Street.*

Assessment: The widening of this section of Route 53 would be a continuation of the existing four-lane cross section to the north, between Rockland Street and Broadway (see Figures C-17, C-26, and C-27).

As described above (see #27), the section of Route 53 between Route 3 (Hanover) and Schooset Street has the highest sustained daily traffic volumes over the longest distance in the corridor. Volumes are between 26,000 and 30,000 vehicles per day over a distance of 6.9 km (4.3 mi).

The abutting land between Broadway and Schooset Street is primarily zoned as business, commercial, or residential in Hanover, and as business in Pembroke. The roadway is functionally classified as Urban Principal Arterial.

As discussed above in #27, the recommended improvements between Rawson Road and Rockland Street, this plan recommends the continued widening of Route 53 from two to four travel lanes as far south as Schooset Street. This creates a Route 53 facility with four travel lanes through one of the most commercially developed sections in the corridor, with increased capacity and with close access to Route 3 (Exit 12 in Pembroke, the interchange with Route 139).

A sidewalk along Route 53 in this section would help local residents access the various commercial establishments. It would also help to reduce the total number of access/egress vehicle movements by providing better pedestrian access between commercial destinations.

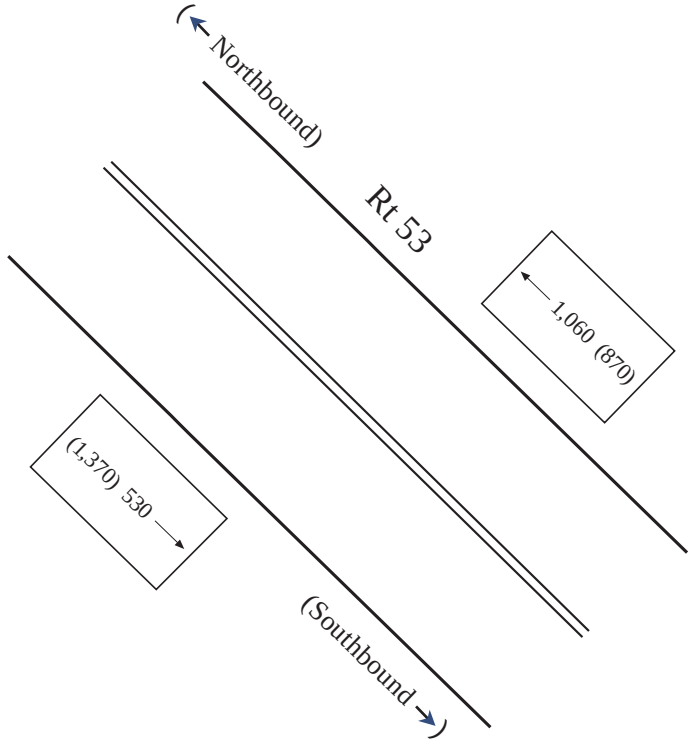
Pembroke

Land use along this 6.0 km (3.7 mi) section of Route 53 (Columbia Road; Washington Street) is mainly residential, combined with stretches of cropland, forest, and open land. Commercial use exists near the intersections at Schooset Street (Route 139), Barker Street (Route 14), Old Washington Street, and Congress Street (Route 14). The roadway has two travel lanes throughout Pembroke, except for four lanes in the densely developed, northernmost section near Schooset Street, close to the Hanover line. There are two signalized intersections and one flashing beacon (at Congress Street) on Route 53 in Pembroke. The roadway is under state jurisdiction (see Figure C-27).

31 ***Route 53 in Pembroke:*** The s*triped shoulders on Route 53 throughout Pembroke appear to be at least 0.6 m (2 ft) wide.*

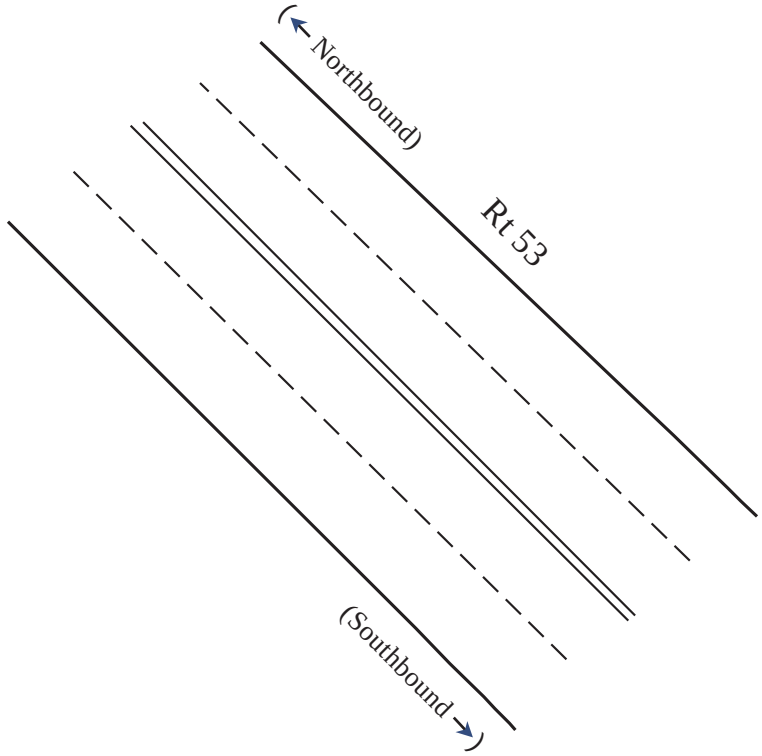
Recommended improvement: *Restripe the lane markings on Route 53 so that, wherever possible, or when future reconstruction of Route 53 occurs, a 2.5 m (8 ft)-wide shoulder is added to both sides of the roadway.*

Existing



Existing highway layout and AM (PM) peak hour volumes

Recommended



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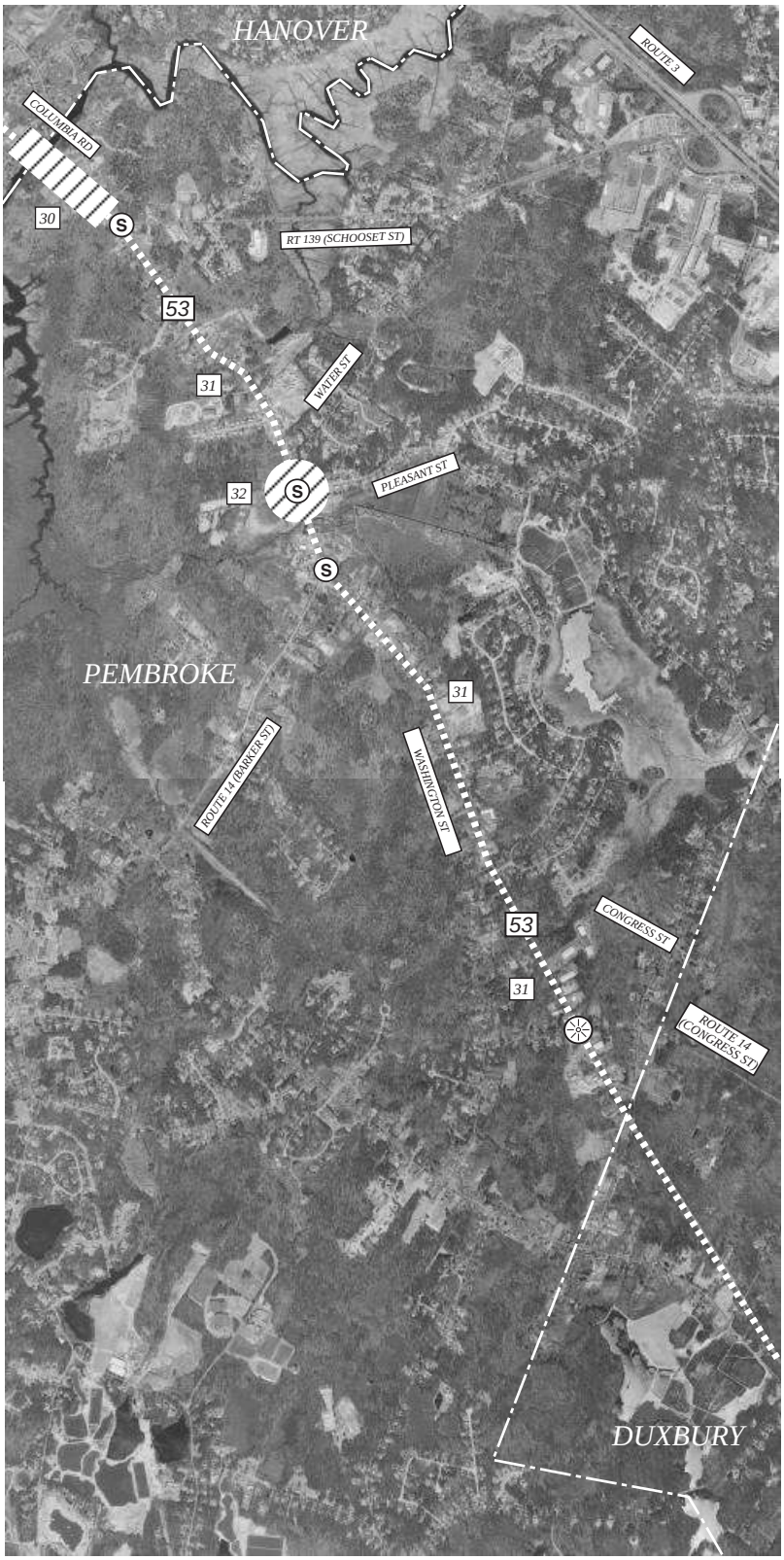
CTPS

Route 53 Corridor Transportation Plan

FIGURE C-26
Route 53 from Broadway (Hanover) to Schooset Street (Pembroke): Existing Geometric Layout and Recommended Transportation Improvements



LOCATIONS OF TRANSPORTATION IMPROVEMENTS:

30 Widen Route 53 to four travel lanes. Add a sidewalk on the northbound side (refer to p. 59 and Figure C-26).

31 Wherever possible, add striped 2.5 m (8 ft) shoulders on both sides of the length of Route 53 in Pembroke. About 0.6 m (2 ft) or wider striped shoulders currently exist (refer to p. 60).

32 Install a new signal and make capacity improvements at Route 53 at Pleasant St. Add sidewalks to the north to Water St and to the south to Barker St (refer to p. 63 and Figure C-28).

CTPS

Route 53 Corridor Transportation Plan

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Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE C-27
Pembroke: Route 53 Layout and Locations of Transportation Improvements

Assessment: To increase overall safety, as well as to provide space for emergency vehicle operations, MassHighway's Highway Design Manual recommends a minimum of 2.5 m (just over 8 ft)-wide shoulders on roadways classified as Urban Arterials.[42] There is a minimum of 18 m (60 ft) of highway layout right-of-way on Route 53, which is classified as Urban Principal Arterial from the Hanover line to Schooset Street, and as an Urban Minor Arterial in the rest of Pembroke.

32 ***Route 53 at Pleasant Street:*** *There are problematic traffic operations at this unsignalized location, particularly for traffic exiting Pleasant Street onto Route 53.*

Recommended improvements *(Build Alternative 4, which includes Build Alternatives 1, 2, and 3 in combination):*

- *Install a new traffic signal at this intersection, including an exclusive pedestrian phase.*
- *Widen Pleasant Street to accommodate exclusive left- and right-turn lanes westbound (Build Alternative 1).*
- *Widen Route 53 and add an exclusive right-turn lane northbound (Build Alternative 2) and an exclusive left-turn lane southbound (Build Alternative 3).*
- *Add loop detectors, signs, and markings for bicyclists.*
- *Add 0.16 km (0.1 mi) of sidewalk to Water Street on the northbound side, and 0.4 km (0.25 mi) of sidewalk south to Barker Street (Route 14) on the southbound side.*

MassHighway has jurisdiction over installing a signal at this location, as well as widening of Route 53. The Town of Pembroke has jurisdiction over widening Pleasant Street. These would be long-range improvements (see Figure C-28).

Assessment: The intersection is currently unsignalized. The westbound (Pleasant Street) approach operates at LOS F during both the AM and PM peak periods. Collision diagrams based on data from the Pembroke police showed that most of the fifteen crashes during 1998–2000 involved vehicles turning left from Pleasant Street colliding with Route 53 through traffic (see Table B-16 and Figure B-9 in Appendix B). Field observations during both the AM and PM peak periods confirmed numerous near misses as well as hurried left turns from Pleasant Street into infrequent gaps in the Route 53 traffic stream.

The location meets five of the eight warrants for traffic-control signal installation: Warrants 1 (Eight-Hour Vehicular Volume), 2 (Four-Hour Vehicular Volume), 3 (Peak Hour), 7 (Crash Experience), and 8 (Roadway Network). It was not tested for Warrants 4 (Pedestrian Volume), 5 (School Crossing), or 6 (Coordinated Signal System).[43]

In order to widen Pleasant Street, some land would need to be taken on the undeveloped southeast corner. The summary table on page 65 shows that a new signal by itself yields only operational LOS D (AM) and E (PM) in 2005, and F (AM and PM) in 2025. When individual turning lanes are added, LOS improves somewhat. However, the greatest improvement occurs when turning lanes on all three approaches are added in combination (Build Alternative 4): LOS C in 2005 (AM and PM), and D (AM and PM) in 2025.

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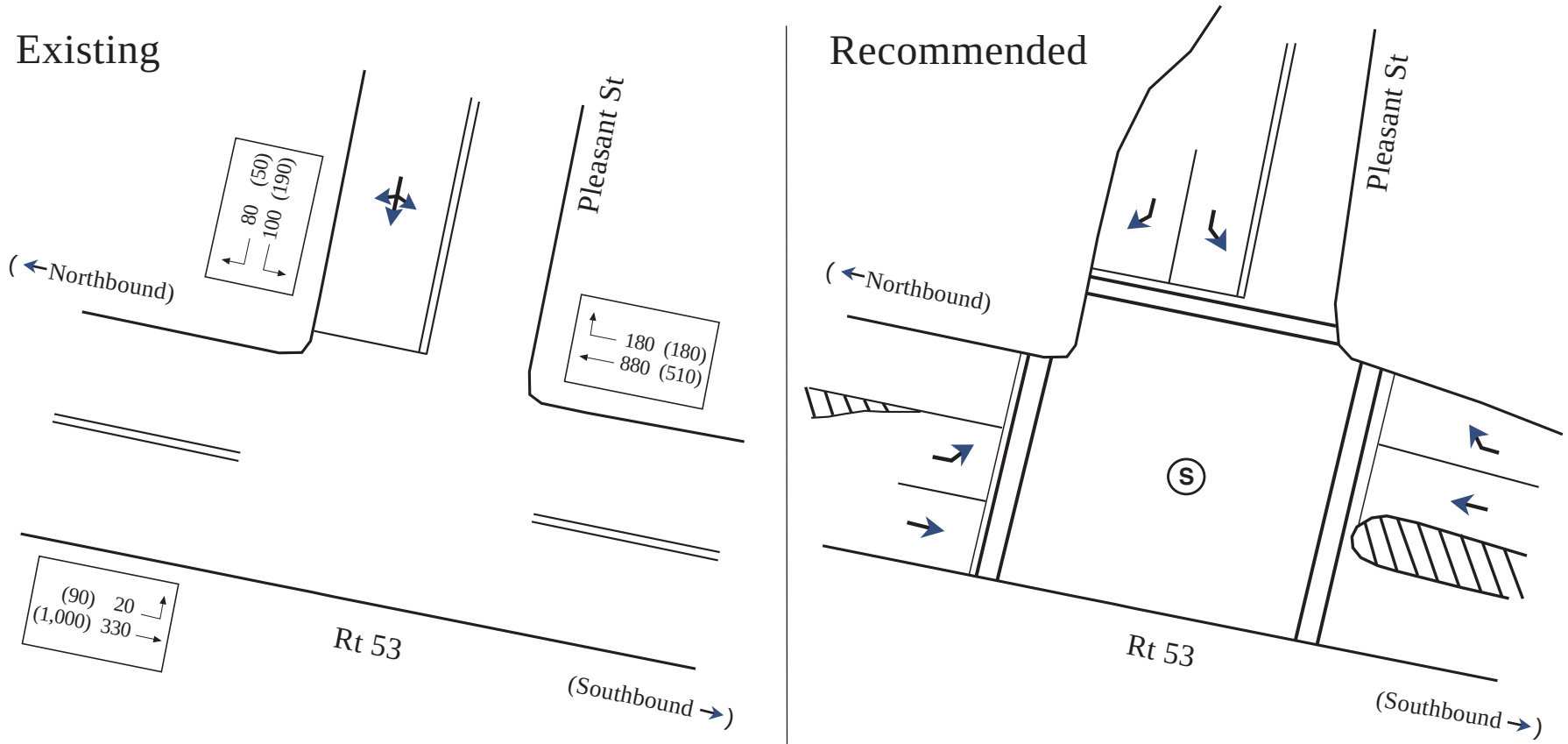
[42] The Commonwealth of Massachusetts, op. cit., p. 5.02.0.

[43] Federal Highway Administration, MUTCD, op. cit., p. 4C-1.



Existing highway layout and AM (PM) peak hour volumes

(Not to scale)

CTPS

Route 53 Corridor Transportation Plan

FIGURE C-28
Route 53 at Pleasant Street (Pembroke): Existing Geometric Layout and Recommended Transportation Improvements

Route 53 at Pleasant Street Intersection Summary:

- Intersection LOS data: Unsignalized

Scenario		AM Peak Hour: LOS / Delay		PM Peak Hour: LOS / Delay	
		SB lefts, throughs	WB lefts, rights	SB lefts, throughs	WB lefts, rights
2000	Existing	B / 11	F / *	A / 10	F / *
2005	No-Build	B / 12	F / *	A / 10	F / *
2025	No-Build	B / 14	F / *	B / 11	F / *

- Number of vehicle crashes, 1998–2000 (Pembroke police): 15 (5 per year)
- Crash rate: 0.61 crashes per million entering vehicles (District 5 average: 0.61)
- Jurisdiction over improvements: MassHighway, Town of Pembroke

- Intersection LOS data: Signalized *(recommended improvement, Build Alternative 4)*

Scenario		AM Peak Hour			PM Peak Hour		
		LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)
2005	New Signal	D	50	69	E	80	99
	Build Alt. 1	D	38	66	E	66	92
	Build Alt. 2	D	38	48	E	59	86
	Build Alt. 3	D	50	68	D	39	69
	Build Alt. 4	C	33	46	C	34	62
2025	New Signal	F	*	110	F	*	>160
	Build Alt. 1	F	*	104	F	*	>160
	Build Alt. 2	E	58	75	F	*	145
	Build Alt. 3	F	*	109	F	*	112
	Build Alt. 4	D	37	70	D	54	101

* = 80 or more seconds total delay for signalized intersections, 50 or more seconds for unsignalized intersections.
Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

The addition of a sidewalk to the north and south of this intersection would contribute to the eventual completion of an unbroken 24.9 km (15.5 mi) section of Route 53 between Quincy and Pembroke that would have sidewalks on at least one side of the roadway. When sidewalks in the already planned and recommended transportation improvements discussed above (see #s 13, 24, 25, 27, and 30) are combined with those already in place, a total of 24.3 km (15.1 mi) of the northern half of Route 53 would have sidewalks on at least one side of the roadway. The recommended new sidewalks between Water Street and Barker Street would add another 0.56 km (0.35 mi). If all recommended sidewalk improvements in this plan materialize, the unbroken 24.9 km (15.5 mi) of sidewalks between Washington Street (Route 3A) in Quincy and Barker Street in Pembroke would be established.

Duxbury

Route 53 in Duxbury stretches for 6.0 km (3.7 mi) from Pembroke in the north to Kingston in the south. It is known alternatively as either Summer Street or King's Town Way. The roadway has one travel lane in each direction throughout Duxbury and is under state jurisdiction. There is very little commercial land use in the corridor. Most of the abutting land is residential. There are

no signalized intersections on Route 53 in Duxbury; however, there are two flashing beacons, one at Elm Street and one at Winter Street (see Figure C-29).

33 ***Route 53 in Duxbury:*** *The striped shoulders on Route 53 throughout Duxbury appear to be at least 0.6 m (2 ft) wide.*

Recommended improvement: *Restripe the lane markings on Route 53 so that, wherever possible, or when future reconstruction of Route 53 occurs, a 2.5 m (8 ft)-wide shoulder is added to both sides of the roadway.*

Assessment: To increase overall safety, as well as to provide space for emergency vehicle operations, MassHighway's Highway Design Manual recommends a minimum of 2.5 m (just over 8 ft)-wide shoulders on roadways classified as Urban Arterials.[44] Route 53 is classified as an Urban Minor Arterial in Duxbury. There is a minimum of about 18 m (60 ft) of highway layout right-of-way on Route 53.

34 ***Route 53 at High Street:*** *High Street intersects with Route 53 at an acute angle, only about 45 m (150 ft) north of the Route 53/Franklin Street intersection.*

Recommended improvements:

- *Realign High Street so it intersects with Route 53 at a right angle.*

MassHighway and the Town of Duxbury share jurisdiction over this geometric intersection improvement. This would be a long-range improvement (see Figure C-30).

Assessment: There is ample space to make the recommended geometric improvement. This would be a safety improvement, since sight distance for vehicles turning from High Street onto Route 53 would be improved both to the north and to the south.

35 ***Route 53 at Winter Street:*** *There are problematic traffic operations at this location, particularly the high rate of vehicle crashes in the intersection.*

Recommended improvements:

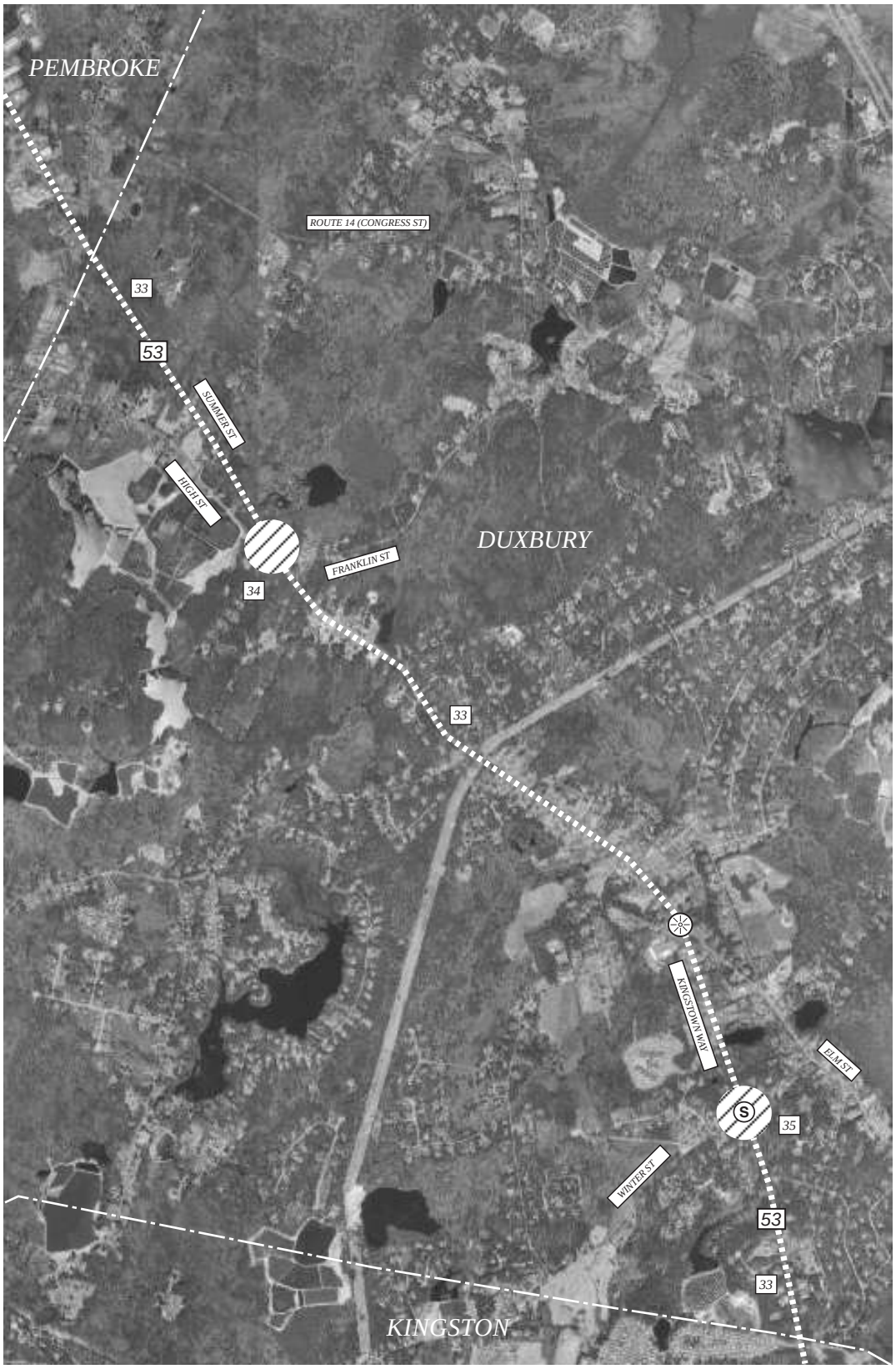
- *Install a new traffic signal at this unsignalized intersection, including an exclusive pedestrian phase.*
- *Add loop detectors, signs, and markings for bicyclists.*

MassHighway has jurisdiction over installation of a signal at this location. This could be a short-range improvement (see Figure C-31). Improvements at this location are listed in the "Supplemental List of Projects" section of the FY 2004 TIP.[45]

Assessment: The intersection is currently unsignalized. The rate of 1.62 crashes per million entering vehicles is the highest in the Route 53 corridor for all unsignalized intersections

[44] The Commonwealth of Massachusetts, op. cit., p. 5.02.0.

[45] Boston MPO, op. cit., p. A-8.



LOCATIONS OF TRANSPORTATION IMPROVEMENTS:

33 Wherever possible, add striped 2.5 m (8 ft) shoulders on both sides of the length of Route 53 in Duxbury. About 0.6 m (2 ft) or wider striped shoulders currently exist (refer to p. 66).

34 Realign intersection at Route 53 at High Street, just north of Franklin St (refer to p. 66 and Figure C-30).

35 Replace the flashing beacon with a new signal at Route 53 at Winter Street (refer to p. 66 and Figure C-31).

CTPS

Route 53 Corridor Transportation Plan

N

Aerial photo source: MassGIS and MIT

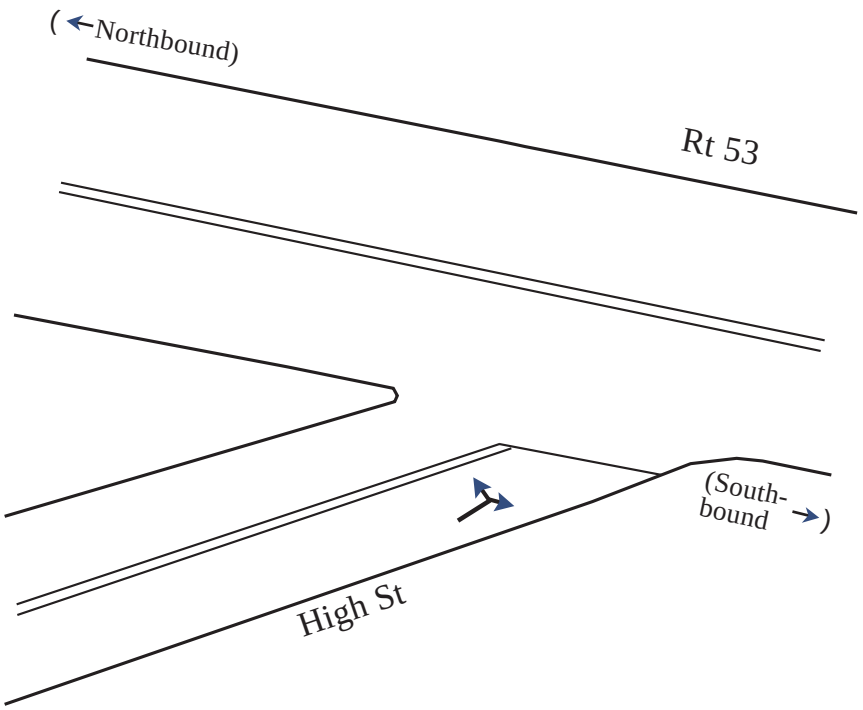
KEY:

(S) = Signalized intersection

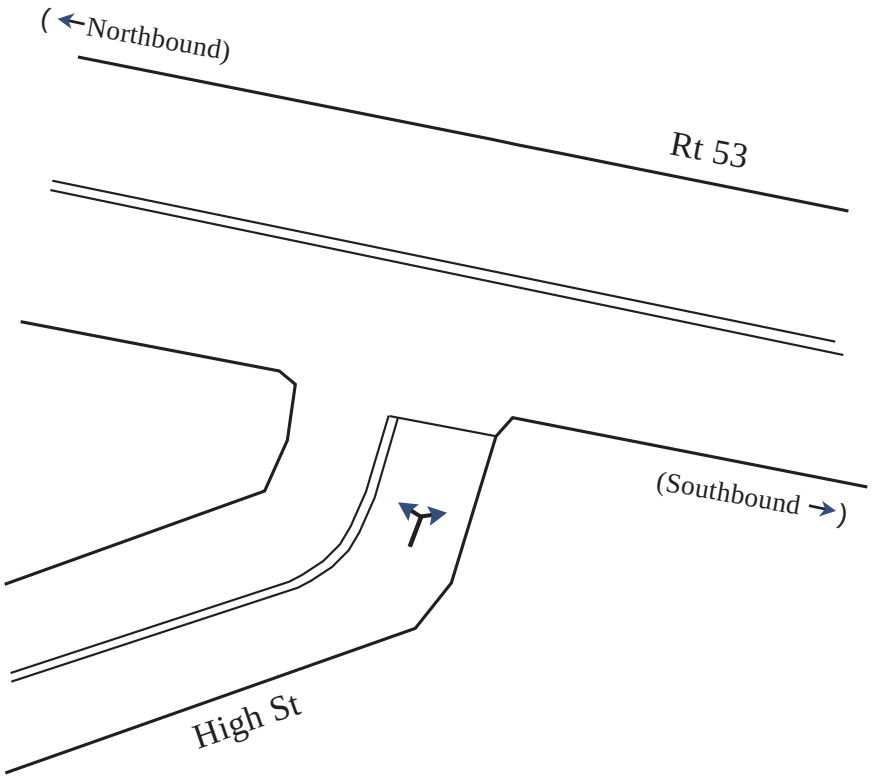
= Flashing red/yellow

FIGURE C-29
Duxbury: Route 53 Layout and Locations of Transportation Improvements

Existing



Recommended



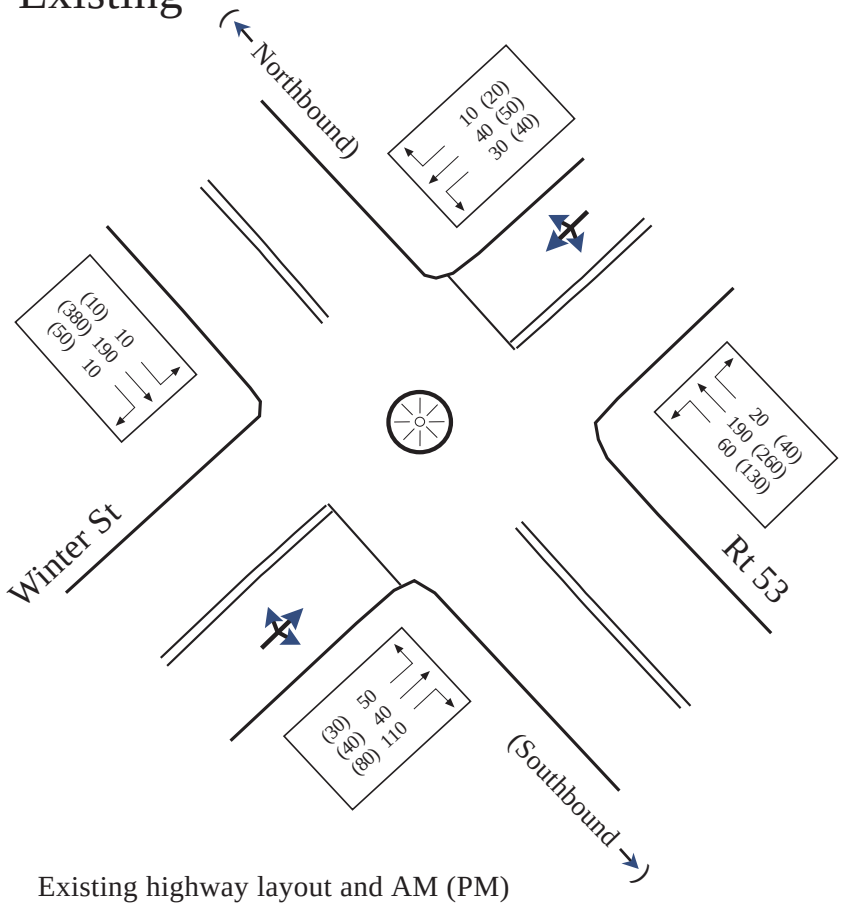
(Not to scale)

CTPS

Route 53 Corridor
Transportation Plan

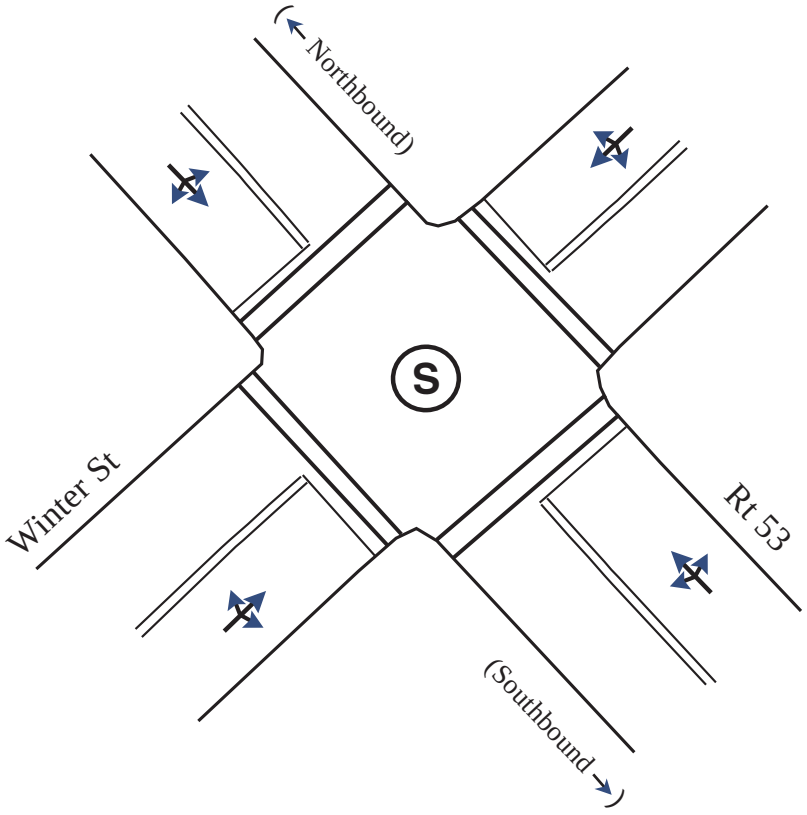
FIGURE C-30
Route 53 at High Street (Duxbury): Existing Geometric Layout and Recommended Transportation Improvements

Existing



Existing highway layout and AM (PM) peak hour volumes

Recommended



(Not to scale)

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Route 53 Corridor Transportation Plan

FIGURE C-31
Route 53 at Winter Street (Duxbury): Existing Geometric Layout and Recommended Transportation Improvements

analyzed in this plan. It significantly exceeds the average MassHighway District 5 rate (0.61) for unsignalized intersections.

Collision diagrams based on data from the Duxbury police showed that most of the twenty-two crashes during 1998–2000 were broadside and angle crashes. The crashes usually involved vehicles exiting Winter Street onto Route 53 colliding with through traffic on Route 53 (see Table B-17 and Figure B-10 in Appendix B).

Both the eastbound and westbound (Winter Street) approaches currently operate at LOS C during the AM peak hour, and at LOS F during the PM peak hour. Based on the LOS analysis, there would be no need to widen the intersection or add turning lanes. The summary table below shows that with the intersection signalized, overall intersection LOS would be C in both the AM and PM peak hours in 2005, and C and D, respectively, in 2025. An exclusive pedestrian phase is included in the recommended signal phasing scheme.

Route 53 at Winter Street Intersection Summary:

- Intersection LOS data: Unsignalized

	AM Peak Hour: LOS / Delay		PM Peak Hour: LOS / Delay	
Scenario	EB, all turns	WB, all turns	EB, all turns	WB, all turns
2000 Existing	C / 17	C / 18	F / *	F / *
2005 No-Build	C / 18	C / 19	F / *	F / *
2025 No-Build	D / 31	D / 30	F / *	F / *

- Number of vehicle crashes, 1998–2000 (Duxbury police): 22 (7.3 per year)
- Crash rate: 1.62 crashes per million entering vehicles (District 5 average: 0.61)
- Jurisdiction over improvements: MassHighway

- Intersection LOS data: Signalized *(recommended improvement)*

	AM Peak Hour			PM Peak Hour		
Scenario	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)
2005 New Signal	C	22	13	C	29	33
2025 New Signal	C	27	21	D	55	60

* = 80 or more seconds total delay for signalized intersections, 50 or more seconds for unsignalized intersections.
Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

Field observations revealed poor sight distance for traffic exiting Winter Street. Looking to the north from Winter Street, Route 53 crests after approximately 90 m (300 ft), obscuring approaching traffic. To the south, vegetation on the southwest corner and a downgrade on Route 53, with a depression after about 120 m (400 ft), both contribute to the poor sight distance in that direction as well. Another factor contributing to unsafe conditions is that Route 53 travel speeds were commonly about 45–50 mph, exceeding the 40 mph posted speed limit.

The location meets four of the eight warrants for traffic-control signal installation: Warrants 2 (Four-Hour Vehicular Volume), 3 (Peak Hour), 7 (Crash Experience), and 8 (Roadway

Network). It does not meet Warrant 1 (Eight-Hour Vehicular Volume). It was not tested for Warrants 4 (Pedestrian Volume), 5 (School Crossing), or 6 (Coordinated Signal System).[46]

In addition to the improvements recommended in this plan, there was a request by local officials that sidewalks along Route 53 in Duxbury be installed. However, MassHighway does not generally install sidewalks along state highways unless a significant reconstruction project is warranted, and, according to this plan, no major reconstruction of Route 53 in Duxbury is warranted at this time.

Kingston

The shortest segment of Route 53 is in Kingston, 0.8 km (0.5 mi)-long, stretching from the Duxbury line to Route 3A, and is under state jurisdiction. This segment of roadway, named Summer Street, has one travel lane in each direction, except near Route 3A, where Route 53 widens to three lanes southbound and two lanes northbound. The only signalized Route 53 intersection in Kingston is at Route 3A/Kingsbury Square Plaza. Route 3A and the Kingsbury Square Plaza driveway both have two lanes in each direction at the intersection. The surrounding land use is a mix of commercial, industrial, and residential (see Figure C-32).

36 ***Route 53 in Kingston:*** *The striped shoulders on Route 53 throughout Kingston appear to be at least 0.6 m (2 ft) wide.*

Recommended improvement: *Restripe the lane markings on Route 53 so that, wherever possible, or when future reconstruction of Route 53 occurs, a 2.5 m (8 ft)-wide shoulder is added to both sides of the roadway.*

Assessment: To increase overall safety and to provide space for emergency vehicle operations, MassHighway's Highway Design Manual recommends a minimum of 2.5 m (just over 8 ft)-wide shoulders on roadways classified as Urban Arterials.[47] Route 53 is classified as an Urban Minor Arterial in Kingston. There is a minimum of about 18 m (60 ft) of highway layout right-of-way on Route 53.

37 ***Route 53 at Silver Birch Lane:*** *There have been instances of operational conflicts between vehicles exiting Silver Birch Lane onto Route 53 and through traffic on Route 53.*

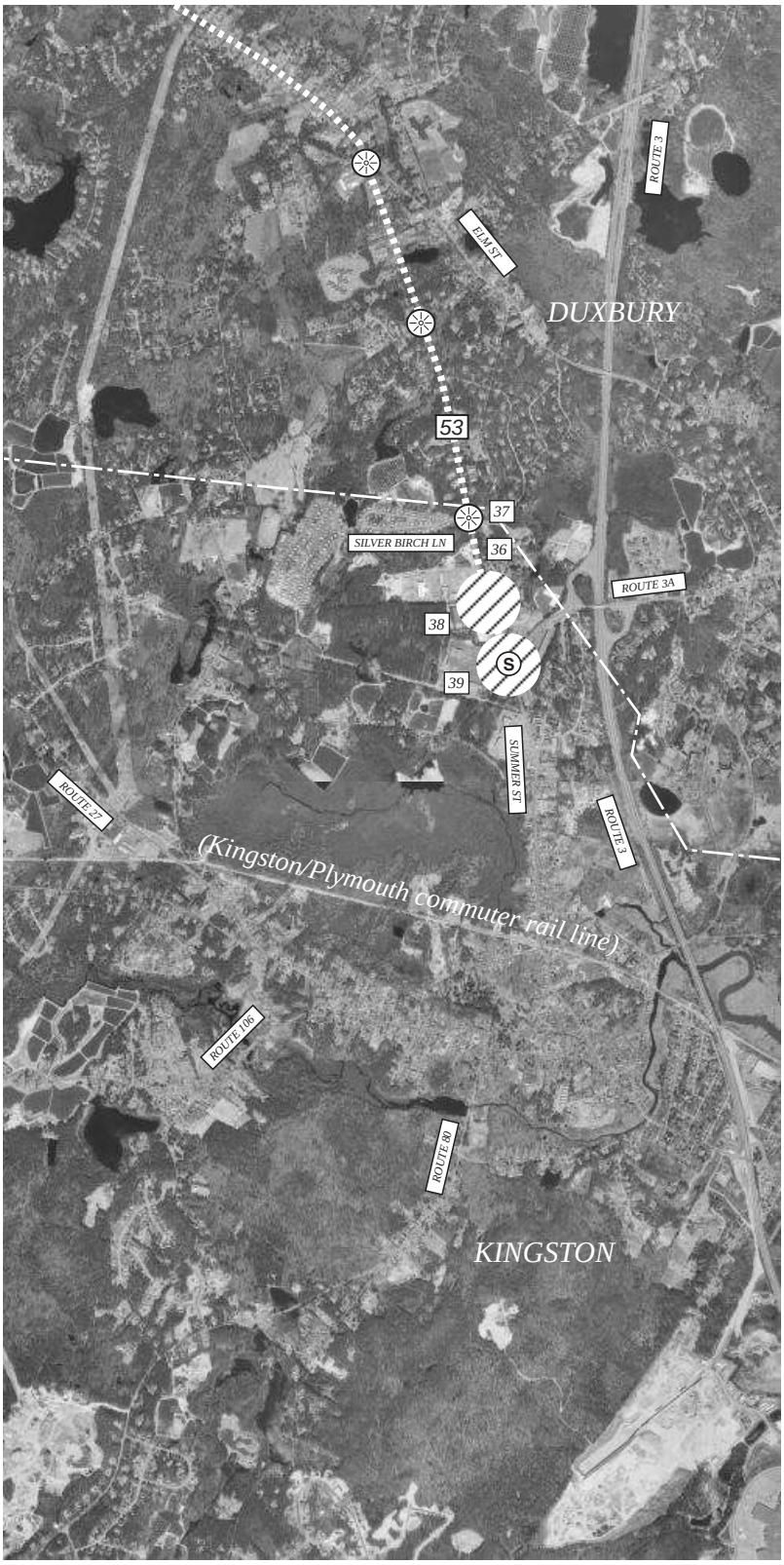
Recommended improvements:

- *Add a flashing beacon at this intersection.*
- *Add signage warning Route 53 northbound and southbound drivers of an intersection ahead.*
- *Enforce the posted speed limit.*
- *Consider changing the striped roadway markings near the intersection from a passing zone (currently permitted in the northbound direction) to a no-passing zone.*

MassHighway has jurisdiction over these improvements, which could be short-range.

[46] Federal Highway Administration, MUTCD, op. cit., p. 4C-1.

[47] The Commonwealth of Massachusetts, op. cit., p. 5.02.0.



LOCATIONS OF TRANSPORTATION IMPROVEMENTS:

36 Wherever possible, add striped 2.5 m (8 ft) shoulders on both sides of the length of Route 53 in Kingston. About 0.6 m (2 ft) or wider striped shoulders currently exist (refer to p. 71).

37 Add a flashing beacon and appropriate intersection signage and roadway striping at the Route 53 at Silver Birch Lane intersection (refer to p. 71).

38 Realign the intersection of Route 53 at Tar Kiln Rd/CVS driveway, and add exclusive turning lanes (refer to p. 73 and Figure C-33).

39 Add turning lanes on three approaches at the Route 53 at Route 3A intersection, and upgrade the existing signal (refer to p. 76 and Figure C-34).

Southern terminus of Route 53 (Summer Street at Route 3A intersection)

CTPS

Route 53 Corridor Transportation Plan

N

Aerial photo source: MassGIS and MIT

KEY:

(S) = Signalized intersection

= Flashing red/yellow

FIGURE C-32
Kingston: Route 53 Layout and Locations of Transportation Improvements

Assessment: These safety improvements would increase awareness of Route 53 drivers approaching the Silver Birch Lane intersection.

There were only three recorded crashes at this intersection between 1996 and 1998, based on Mass. Registry data. There are currently no capacity problems, and the location meets none of the warrants required for installation of a new traffic signal. However, the MUTCD states that flashing beacons "may be used at intersections where traffic or physical conditions do not justify conventional traffic control signals but crash rates indicate the possibility of a special need." Although crash rates at Route 53 at Silver Birch Lane by themselves do not justify the installation of a flashing beacon, it is acknowledged that a retirement community exists immediately to the west of the intersection. This fact, and the fact that prevailing travel speeds clearly exceed the 40 mph posted speed limit, make the case for enhancing safety by installing a flashing beacon, as well as adding appropriate intersection signage and roadway markings.[48]

38 ***Route 53 at Tar Kiln Road:*** *There are problematic traffic operations at this location, in part due to inferior intersection geometry.*

Recommended improvements:

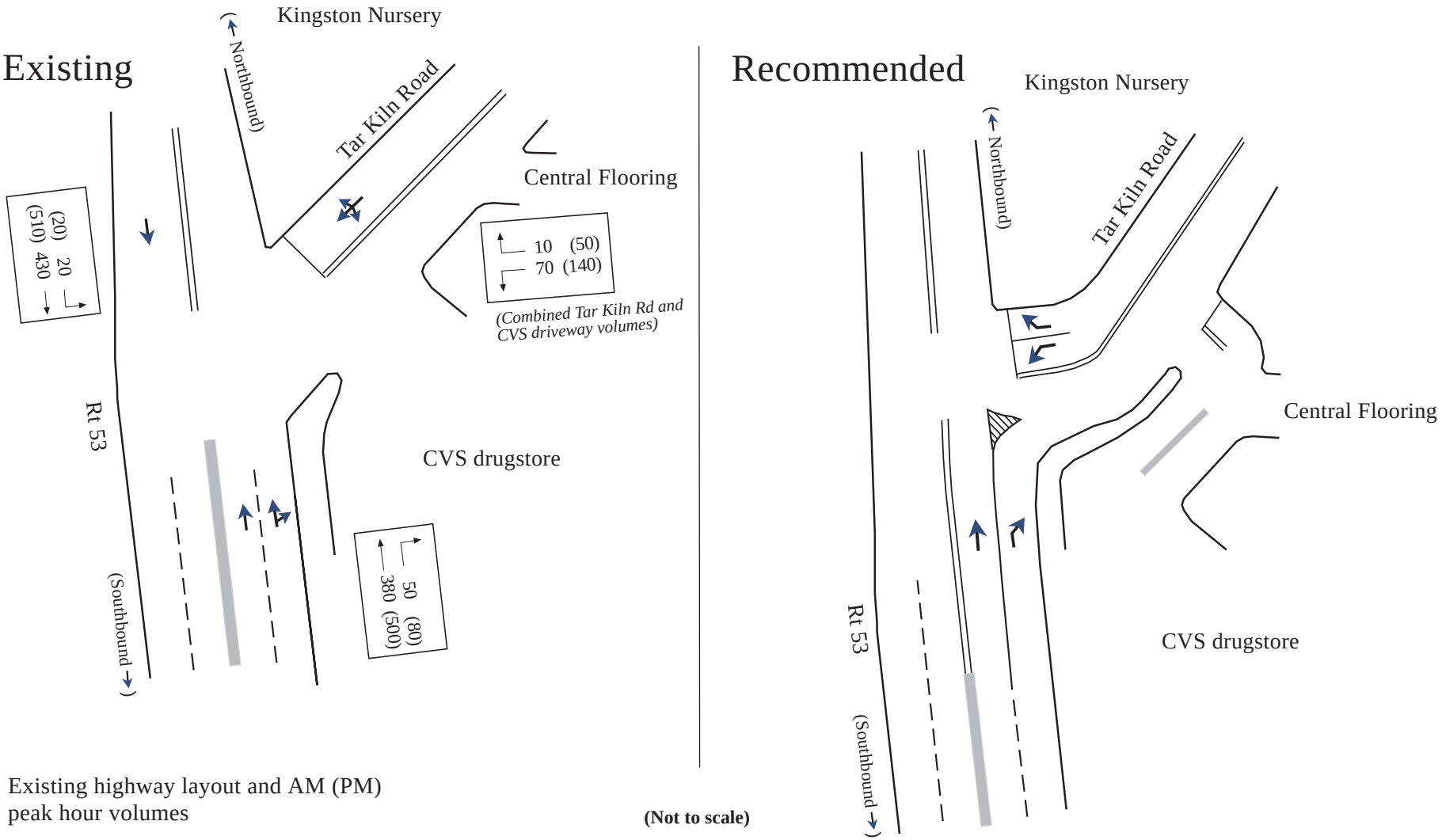
- *Realign the intersection by taking land south of the Kingston Nursery and combine Tar Kiln Road and the CVS driveway so that the new combined road would meet Route 53 at a right angle.*
- *Restripe the lane markings and intersection geometry so that the Route 53 northbound outside lane becomes an exclusive right-turn lane to Tar Kiln Road.*

MassHighway and the Town of Kingston have jurisdiction over the recommended improvements. These could be short-range improvements (see Figure C-33).

Assessment: This unsignalized intersection experienced fifteen crashes during a three-year period, April 1998 through March 2001, based on Kingston police data. This translates into a rate of 0.94 crashes per million entering vehicles, exceeding the average MassHighway District 5 crash rate for unsignalized intersections, which is 0.61. Except for the fact that thirteen of the fifteen crashes were angle crashes, there were no discernible crash patterns in the intersection collision diagram (see Table B-18 and Figure B-11 in Appendix B).

LOS analysis showed that the intersection currently operates at LOS A (southbound left turns and throughs) and C (westbound left and right turns) in the AM peak hour, and at LOS A (southbound left turns and throughs) and F (westbound left and right turns) during the PM peak hour (see summary table on page 75). When a Route 53 northbound exclusive right-turn lane, and westbound exclusive left- and right-turn lanes on a realigned Tar Kiln Road are added, LOS is still at A and C in the 2005 AM peak hour, and A and D in the 2025 AM peak hour, and improves slightly to LOS A and E in the 2005 PM peak hour, but remains at LOS A and F in the 2025 PM peak hour.

[48] Federal Highway Administration, MUTCD, op. cit., pp. 2C-28, 29 (sign W2-2), and p. 4K-1 (section 4K.02).



Existing highway layout and AM (PM) peak hour volumes

(Not to scale)

CTPS

Route 53 Corridor Transportation Plan

FIGURE C-33
Route 53 at Tar Kiln Road/CVS driveway (Kingston): Existing Geometric Layout and Recommended Transportation Improvements

Route 53 at Tar Kiln Road Intersection Summary:

- Intersection LOS data: Unsignalized *(recommended improvement, Build Alternative 1)*

		AM Peak Hour: LOS / Delay		PM Peak Hour: LOS / Delay	
Scenario		SB, lefts and throughs	WB, lefts and rights	SB, lefts and throughs	WB, lefts and rights
2000	Existing	A / 8	C / 19	A / 9	F / *
2005	No-Build	A / 8	C / 21	A / 9	F / *
	Build Alt. 1	A / 8	C / 19	A / 9	E / 45
2025	No-Build	A / 9	D / 31	A / 9	F / *
	Build Alt. 1	A / 9	D / 28	A / 9	F / *

- Number of vehicle crashes, April 1998–March 2001 (Kingston police): 15 (5 per year)
- Crash rate: 0.94 crashes per million entering vehicles (District 5 average: 0.61)
- Jurisdiction over improvements: MassHighway, Town of Kingston, CVS

- Intersection LOS data: Signalized *(possible improvement)*

		AM Peak Hour			PM Peak Hour		
Scenario		LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)
2005	New Signal	A	8	10	B	11	16
2025	New Signal	A	9	12	B	13	21

* = 80 or more seconds total delay for signalized intersections, 50 or more seconds for unsignalized intersections.
Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

The installation of a traffic signal improves the overall intersection LOS to A in both the 2005 and 2025 AM peak hours, and to LOS B in the 2005 and 2025 PM peak hours. Although eight-hour counts were not available, it is estimated that the location does meet five of the eight warrants for traffic-control signal installation: Warrants 1 (Eight-Hour Vehicular Volume), 2 (Four-Hour Vehicular Volume), 3 (Peak Hour), 7 (Crash Experience), and 8 (Roadway Network). The intersection was not tested for Warrants 4 (Pedestrian Volume), 5 (School Crossing), or 6 (Coordinated Signal System).[49]

This plan does not at this time recommend that a signal be installed at the Route 53/Tar Kiln Road intersection. Despite the fact that the westbound approach, if the intersection remains unsignalized but receives added turning lanes, would operate at LOS E and F during the 2005 and 2025 PM peak hours, respectively, it is felt that a realigned intersection would be a clear safety improvement. Additionally, Tar Kiln Road intersects with Route 53 close to the signalized Route 3A intersection, about 75 m (250 ft) to the north. It is recommended, therefore, that as a first step only the exclusive turning lanes be added to the realigned westbound approach. Should operational problems persist in the future, only then would a new traffic signal be considered. At that time, it is recommended that the two signals located in such close proximity be coordinated.

[49] Ibid., p. 4C-1.

39 ***Route 53 at Route 3A:*** *Improvements at this location are scheduled to occur during FY 2006 in the Old Colony Planning Council (OCPC) TIP.*

Planned improvements:

- *Add a second southbound departure lane on Route 3A.*
- *Add an exclusive left-turn lane on the eastbound Kingsbury Square Plaza driveway.*
- *Add an exclusive westbound right-turn lane onto Route 53 northbound.*
- *The signal will be upgraded; however, there is no mention of improvements for pedestrians or bicycle traffic.*

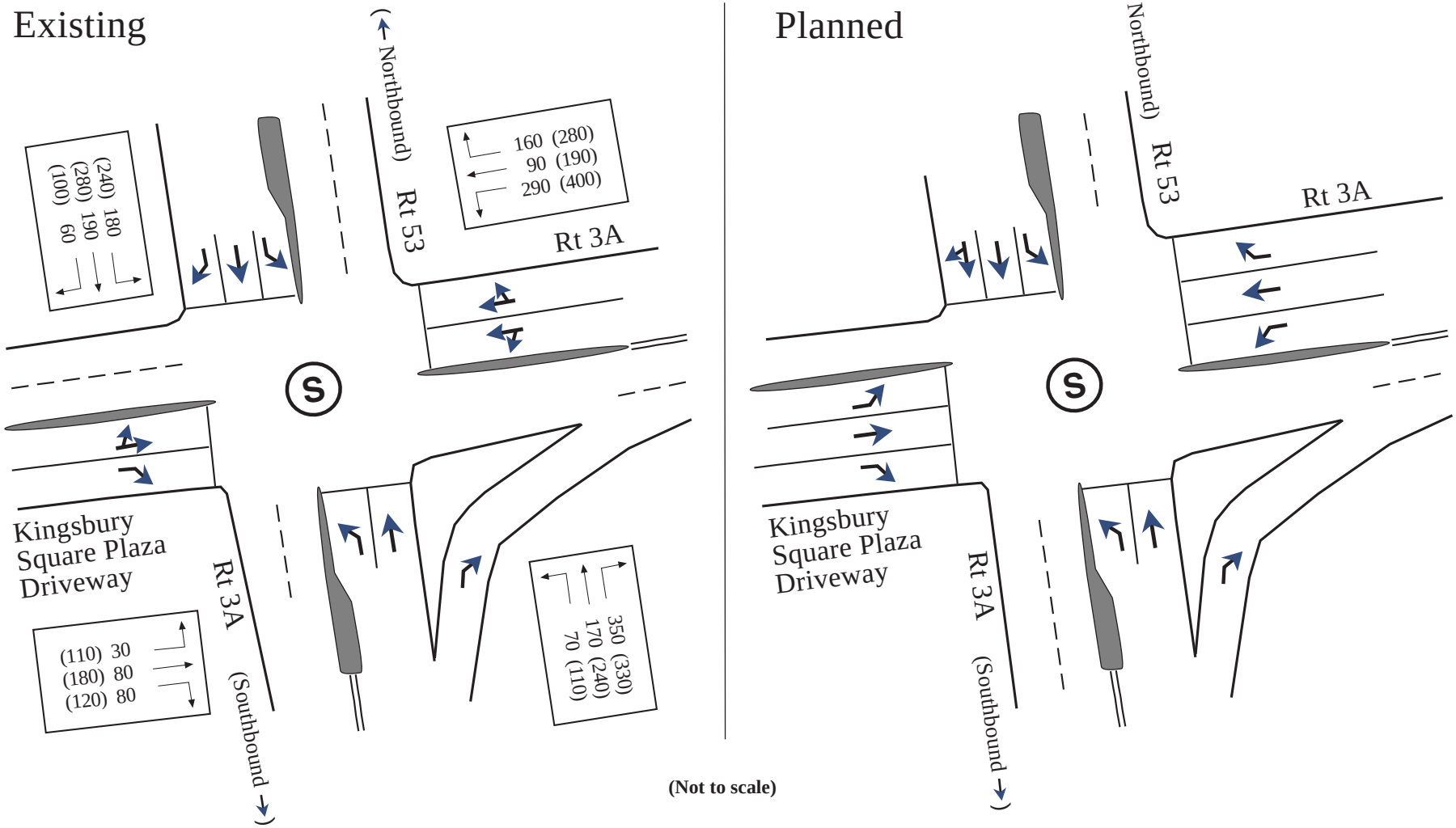
Although these improvements, which are under the jurisdiction of MassHighway, are mentioned in a related VHB analysis,[50] there is no traffic study available that describes the impacts of the improvements. Given the existing geometric layout and turning volumes, however, it is possible to estimate the anticipated operational effects of the improvements. These are discussed below (see Figure C-34).

Assessment: The heavy left- and right-turn intersection volumes, particularly on the Route 3A westbound approach during the PM peak hour, seem to warrant their own respective exclusive lanes. It is presumed that there will be exclusive signal phases for all left-turn movements.

The summary table on page 78 shows that the intersection currently operates at LOS D in both the AM and PM peak hours. Optimizing the signal timing improves conditions somewhat.

When the planned improvements are in place, LOS improves only marginally overall. If an exclusive pedestrian phase is included in the signal timing scheme, operational LOS decreases to D in the 2005 and 2025 AM peak hours, and to LOS E and F, respectively, in the 2005 and 2025 PM peak hours.

[50] Vanasse Hangen Brustlin, Inc., "Proposed Kingsbury Club Expansion, 185 Summer Street (Route 53), Kingston, Massachusetts," December 16, 1998.



(Not to scale)

CTPS

Route 53 Corridor
Transportation Plan

FIGURE C-34
Route 53 at Route 3A (Kingston):
Existing Geometric Layout and Planned Transportation Improvements

Route 53 at Route 3A Intersection Summary:

- Intersection LOS data:

	AM Peak Hour			PM Peak Hour		
Scenario	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)	LOS	Intersection Delay (sec.)	Total Avg. Queue (# veh.)
2000 Existing	D	39	55	D	53	95
Signal Optim'n	C	28	37	D	48	86
2005 No-Build	D	40	59	E	59	103
Signal Optim'n	C	29	39	D	54	94
Build Alt. 1	C	32	38	D	46	80
Alt. 1 w. exclusive Ped. Phase	D	46	53	E	71	99
2025 No-Build	D	49	81	F	*	156
Signal Optim'n	D	39	57	F	*	156
Build Alt. 1	D	36	51	E	62	116
Alt. 1 w. exclusive Ped. Phase	D	53	72	F	*	150

- Number of vehicle crashes, 1996–1998 (Mass. Registry): 22 (7.3 per year)
- Crash rate: 0.70 crashes per million entering vehicles (District 5 average: 0.85)
- Jurisdiction over improvements: MassHighway

* = 80 or more seconds total delay for signalized intersections, 50 or more seconds for unsignalized intersections.
Note: Total Average Queue is the average number of queued vehicles at the intersection during a given signal cycle.

PUBLIC TRANSPORTATION SERVICES

It has become clear that in any major urban area, there needs to be a multimodal make-up of the local transportation system. Particularly in an area where traffic levels continue to rise each year, an over-reliance on the automobile for the majority of urban trips increases the likelihood of congestion and, ultimately, paralysis on highways and arterials.

The metropolitan Boston area, in contrast to other, newer, urban areas in the U.S., has benefited from having a relatively balanced transportation system in terms of a variety of available modes. The highway and arterial roadway network is complemented by commuter rail, rapid transit, light rail, buses (public and private), and commuter boats. With the exception of light rail, the South Shore area in general, and the Route 53 corridor specifically, has all the modes described as part of its modal mix, at least to a limited extent (see Figure C-35).

Presented above are 39 transportation improvements, mostly affecting automobile travel on Route 53 from Quincy to Kingston. Some of these are recommended in this plan, by CTPS, for the first time; some were developed earlier by others; some have recently been implemented; and some are scheduled to be implemented within the coming fiscal year, as shown in the Boston MPO TIP.[51]

[51] Boston MPO, op. cit.

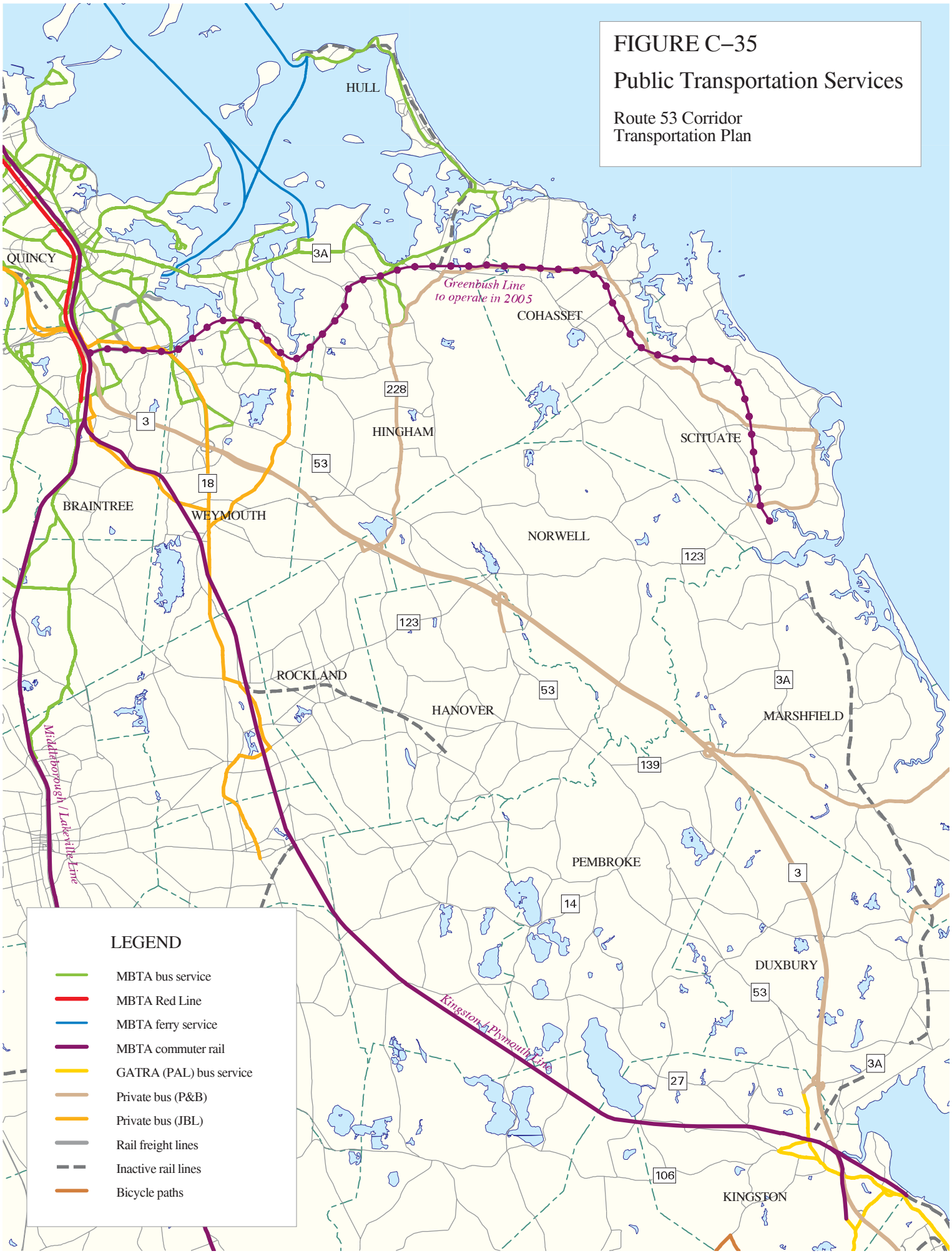


FIGURE C–35
Public Transportation Services
Route 53 Corridor
Transportation Plan
HULL
QUINCY
3A
Greenbush Line
to operate in 2005
COHASSET
228
3
HINGHAM
SCITUATE
53
18
BRAINTREE
WEYMOUTH
NORWELL
123
123
ROCKLAND
53
3A
HANOVER
MARSHFIELD
Middleborough / Lakeville Line
139
PEMBROKE
3
14
DUXBURY
53
Kingston / Plymouth Line
3A
27
106
KINGSTON
LEGEND
MBTA bus service
MBTA Red Line
MBTA ferry service
MBTA commuter rail
GATRA (PAL) bus service
Private bus (P&B)
Private bus (JBL)
Rail freight lines
Inactive rail lines
Bicycle paths

What follows are recommended public transportation improvements for Route 53 and the general South Shore area. The format of presentation is different than for the 39 improvements described above. Instead of the public transportation improvements being presented on a town-by-town basis, because of its more regional nature and impact area the improvements are discussed from more of a sub-regional perspective.

Program for Mass Transportation (PMT)

The Program for Mass Transportation (PMT) is a central element of capital planning at the MBTA and is the foundation for transit infrastructure planning and programming in Eastern Massachusetts. The PMT defines a vision for regional mass transportation and sets priorities for infrastructure investments in the areas of system preservation, service enhancement, and system expansion, without financial constraints. The PMT analyzes potential service enhancement and system expansion projects and gives a high, medium, or low priority rating to each of them.

Among the service enhancement projects are those that increase parking at commuter rail, commuter boat, and heavy rail/light rail stations. Stations that lack elements necessary for project development, such as municipal support and property available for expansion, are given low priority. A low priority is also assigned to stations where an expansion was completed within the last ten years or is currently underway.[52]

Commuter rail

40 ***The Greenbush branch of the Old Colony Line.***

Recommended improvement: *Restore the Greenbush branch to full commuter rail service.*

This project has recently been approved for implementation. Jurisdiction belongs to the MBTA, and the tentative completion date is 2006.

Assessment: This plan will not review the pros and cons of this project in detail. However, the overall assessment is that the restoration of this line would bring numerous benefits, transportation and otherwise, to the abutting communities and South Shore area. The PMT has given a high-priority rating to the completion of this restoration project. The project will:

- Alleviate congestion on parallel roadways
- Provide a one-seat ride to downtown Boston
- Enhance transportation options for those with limited mobility
- Increase the potential for reverse commuting
- Enhance overall town property values
- Increase the potential for economic development near station areas

41 ***Various stations on the Kingston/Plymouth commuter rail line.***

Recommended improvement: *To the greatest extent possible, add more parking spaces at stations along the Kingston/Plymouth commuter rail line.*

[52] Prepared for the MBTA by CTPS, "Program for Mass Transportation," Draft, May 2003.

These could be short- or long-range improvements. Jurisdiction would belong to the MBTA and the individual towns where the stations are located.

Assessment: Six of the seven stations on the Kingston/Plymouth line have parking lot utilization rates ranging from 89% to 106%. The six stations, from highest to lowest, are Hanson (106%), Abington (105%), South Weymouth (100%), Halifax (95%), Whitman (92%), and Kingston (89%). The Plymouth station lot was used at just 7% capacity.[53]

Anecdotal evidence indicates that the demand for parking at many stations often exceeds supply, and that passengers need to arrive early in the morning to find available parking. Additional analysis would be necessary to determine the feasibility of increasing the number of parking spaces at these and other stations.

Parking expansion projects at the Kingston and Whitman stations were given high priority in the PMT, while expansion at the Abington and South Weymouth stations was rated medium priority. Expansion at Halifax and Hanson stations was rated low priority.

Rapid transit

42 ***Red Line stations in Quincy and Braintree.***

Recommended improvement: *To the greatest extent possible, add more parking spaces at Red Line stations in Quincy and Braintree.*

Implementation could be short- or long-range and would fall under the jurisdiction of the MBTA and of each individual town.

Assessment: Just as at many commuter rail stations, passengers using the Red Line in Quincy and Braintree experience a shortage of available parking. Proposed expansion plans include 111 new spaces at the North Quincy station and an estimated 1,300 new spaces at the Quincy Adams station. Braintree officials are considering adding parking spaces near the existing station parking facility that would be available only for Braintree residents.

The PMT has given a high-priority rating to parking expansion projects at North Quincy and Quincy Adams stations and a low-priority rating to parking expansion at the Wollaston station.

Bus

43 ***Local bus service is lacking in much of the Route 53 corridor.***

Recommended improvement: *Extend local bus service to Hanover Mall from the Red Line via Route 53.*

This improvement could be short-range and would fall under MBTA's jurisdiction, in cooperation with private bus carriers in the area.

[53] Based on three one-day counts in April, 2001, June 2001, and May 2002 (Source: OCPC).

Assessment: Numerous examples exist throughout the region of major shopping malls and retail districts being linked to rapid transit stations and commuter rail stations via local bus routes. Some of these routes have existed for years, and both private and public carriers are involved. Included in this group are:

- MBTA bus route #236 from the Quincy Center Red Line station to the South Shore Plaza in Braintree
- BAT (Brockton Area Transit) from the Westgate Mall in Brockton to Cobbs Corner shopping area in Canton, via Stoughton (one block from the commuter rail station)
- MBTA bus route #716 between the Mattapan Red Line trolley station and the Cobbs Corner shopping area in Canton

Local bus service on Route 53 is limited. It currently exists only in the northern section, on about 16% of the corridor's 35.6 km (22.1 mi) length (see Figure C-35). MBTA bus route #225 from Quincy Center runs partially on Route 53 in Quincy, Braintree, and Weymouth; JBL Bus Lines runs two buses during the AM and PM peak periods, on a short section of Route 53 in Weymouth; and the Plymouth & Brockton Street Railway Co. provides bus service to only one location on Route 53, the Hanover Mall, and only twice during each peak period (AM and PM).

This plan suggests that a case can be made for extending local bus service about 12.6 km (7.8 mi) through the most congested section of Route 53. The highest daily traffic volumes are in the Weymouth Landing area (33,000 vehicles), which currently has bus service. The next two highest-volume locations are at Hanover Mall (29,700 vehicles), and south of Queen Anne's Corner at the Hingham/Norwell line (28,900 vehicles). Neither of the latter two locations currently has local bus service.

This section is also the densest in the corridor in terms of employment opportunities, in addition to those at the Hanover Mall. Examples are Route 53 between Route 18 and Pleasant Street in Weymouth; the forthcoming Erickson Retirement Community on Route 53 in Hingham; the former Hingham Plaza, near Route 53 on Derby Street in Hingham, currently undergoing renovation and the addition of new commercial establishments; and the densely developed commercial, office, and service-related employment district near Queen Anne's Corner at the Hingham/Norwell line. Beneficiaries of new bus service through this densely developed corridor to Hanover Mall would be those residents in Quincy, Braintree, Weymouth, Hingham, Norwell, and Hanover who do not have an automobile, as well as the elderly, students, and mall employees.

44 ***Potential for feeder bus service between the Kingston/Plymouth commuter rail line and major residential areas and/or employment centers in the Route 53 corridor.***

Recommended improvement: *Investigate the potential for feeder bus service from (a) Hanover via Rockland to Abington commuter rail station, (b) South Duxbury via Pembroke to Hanson Station, and (c) the Accord Industrial Park in Norwell to Abington Station.*

These improvements could be short-range and jurisdiction would fall under the MBTA, private bus companies, the towns involved, and businesses located in the Accord Industrial Park.

Assessment: Recommended improvements (a) and (b) are listed in the PMT and have been given high priority.

With regard to (c), the distance between the Abington commuter rail station and the Accord Industrial Park is 10 km (6.2 mi). The area around the industrial park, near the junction of Routes 53 and 228 at the Hingham/Norwell line, is one of the densest employment areas in the Route 53 corridor. Field observation revealed at least 50 large and small businesses within the park itself: corporate headquarters, offices, warehouses, restaurants, a school, a day care center, and a nursing home. Surrounding the park are numerous office and retail establishments, including Blue Cross/Blue Shield, Merrill Lynch, and Home Depot in Rockland, and the South Shore Medical Center and Washington Square Office Park in Norwell. Further study is recommended to see if a Transportation Management Association (TMA) could be established in this area of dense development. Currently, no TMAs exist on the South Shore.

Potential benefits from the establishment of a TMA, as described by CARAVAN, are: "From the business leaders' perspective, a TMA provides effective lobbying for transportation improvements; saves money through jointly-funded employee transportation services; facilitates implementation of transportation impact mitigation agreement provisions for new developments; and, ensures that public sector programs and regulations better reflect business concerns."[54]

Commuter boat

45 ***Parking facilities for commuter boat passengers at the Hingham Shipyard.***

Recommended improvement: *Increase the capacity of the existing parking lot, which currently has 1,600 spaces.*

This improvement could be short-range and would fall under the jurisdiction of the MBTA and the Town of Hingham.

Assessment: Anecdotal evidence indicates that the existing parking lot fills up early. Since demand exceeds supply, it is recommended that there be a substantial increase in parking capacity in order to meet current and anticipated demand. The PMT has given medium priority to expanding parking at the Hingham Shipyard.

Other

46 ***Access to the former South Weymouth Naval Air Station.***

Recommended improvement: *This plan supports the efforts to establish a regional transportation center at the junction of Route 18, Naval Air Station Road/Trotter Road, and the South Weymouth commuter rail station.*

[54] CARAVAN for Commuters, Inc., Commuter Information Center, Transportation Management Associations, May 2003.

This improvement would be long-range, and the MBTA, the towns of Weymouth, Rockland, and Abington, Lennar Partners (the Naval Air Station master developer), and the South Shore Tri-Town Development Corporation would have jurisdiction.

Assessment: Benefits of a regional, intermodal transportation center at this location might include:

- Reduction of single-occupancy automobiles on nearby highways and arterials
- Added mobility with the addition of a shuttle bus from the commuter rail station to the various anticipated office, retail, and residential developments on the former base
- Added mobility with the integration of existing local bus service along Route 18 from Whitman, Abington, Braintree, and Weymouth (JBL Bus Lines Inc.)
- Increased potential for reverse commuting from Boston, Quincy, and Braintree to anticipated employment opportunities on the base[55]

47 ***This plan supports the continued use of existing CARAVAN vanpools, as well as carpools, between the South Shore and Boston, as well as increased use of park-and-ride lots along Route 3 at exit 10 (Kingston), exit 12 (Pembroke), and exit 14 (Rockland).***

PEDESTRIANS AND BICYCLES

As congestion levels on roadways grow, it has become increasingly important to accommodate alternative modes such as walking and bicycling. This is true not only from a safety perspective, but also from a standpoint of reducing overall congestion.

The Route 53 corridor varies with respect to accommodations for pedestrians and bicyclists, depending on the individual abutting community and the distance from Boston. The following two sections describe existing conditions and recommended improvements for pedestrians and bicyclists on Route 53, respectively.

Pedestrians

48 ***Sidewalks.*** Of the 35.6 km (22.1 mi) of roadway in the Route 53 corridor, there are currently sidewalks on at least one side over a total distance of 15.6 km (9.7 mi), or 44%. However, virtually all of the sidewalks are in the more densely developed communities close to Boston. Quincy, Braintree, Weymouth, Hingham, and Norwell constitute the northernmost 15.9 km (9.9 mi) of the corridor, and there are sidewalks on one or both sides of 13.8 km (8.6 mi), or 87%, of this stretch (see Figure C-36).

This plan has recommended a number of locations in the corridor for existing sidewalks to be refurbished, or for new sidewalks to be added, either as mitigation or as part of upgrading the roadway (see locations #4, 9, 13, 24, 25, 27, and 30 above). The table on page 86 shows a summary of existing Route 53 sidewalk lengths, by community, and the total length of sidewalks that would exist if recommended improvements were to be implemented.

[55] The Patriot Ledger, "Transit center favored at base: Plan offers MBTA land for Old Colony parking," August 23, 2001.

Sidewalk Length, Route 53 Corridor			
		Sidewalk Length	
Town	Route 53 km (mi)	Existing total	New total, with recommended improvements
Quincy	1.4 (0.9)	1.4 (0.9)	1.4 (0.9)
Braintree	2.3 (1.4)	2.3 (1.4)	2.3 (1.4)
Weymouth	5.1 (3.2)	5.1 (3.2)	5.1 (3.2)
Hingham	3.5 (2.2)	1.4 (0.9)	3.5 (2.2)
Norwell	3.5 (2.2)	3.5 (2.2)	3.5 (2.2)
Hanover	7.1 (4.4)	0.4 (0.25)	7.1 (4.4)
Pembroke	6.0 (3.7)	1.4 (0.85)	1.9 (1.2)
Duxbury	6.0 (3.7)	—	—
Kingston	0.8 (0.5)	—	—
Total	35.6 (22.1)	15.6 (9.7)	24.9 (15.5)

49 ***Pedestrian crossings.*** Most of the major signalized intersections in the corridor have crosswalks and pedestrian button signal posts. The intersections vary as to whether or not an exclusive pedestrian signal phase exists. Two exclusive pedestrian signals exist in the corridor: one north of Bickford Road in Braintree, in the vicinity of American Prosthetics/Joan's Olympic Gym, and the other north of Knollwood Road in Norwell, near a church. There are no pedestrian bridges crossing over Route 53.

Recommended pedestrian improvements in this plan include crosswalks at three intersections in the Route 53 corridor for which new traffic signals have been recommended. The new signals are recommended for Route 53 at East Street in Hanover (#28 above), Pleasant Street in Pembroke (#32), and Winter Street in Duxbury (#35). In addition to crosswalks and push-button activation, exclusive pedestrian phases are also recommended as part of the phasing sequence at these intersections.

50 ***Trails.*** Pedestrian trails have been considered by local officials for two locations in the Route 53 corridor. A number of improvements have been recommended for Weymouth Landing, near the Braintree/Weymouth line, as part of the mitigation for restoring the Greenbush commuter rail line. In addition to roadway and parking improvements around the proposed station area, an improvement benefiting pedestrians involves a walking trail and a park along Smelt Brook.

Another proposed trail would involve conversion of an inactive railroad spur, the former Hanover branch of the Old Colony Rail Line. Once funding is available, and the transfer of the railbed by the MBTA to the town takes place, it is anticipated that a pedestrian/bicycle trail will be designed and built. Since this trail would stretch from north Abington and run through Rockland to Hanover in the vicinity of Broadway, it is hoped that it will become part of a greater trail system linking Abington, Rockland, and Hanover to the ocean either via Pembroke and Marshfield, or via Norwell and Scituate.[56]

[56] The Patriot Ledger, "Report on trails theme familiar: Panel's criticism not surprising to local leaders," May 23, 2001; also, Hanover News, "Rails to trails gets $100K boost," December 19, 2001.

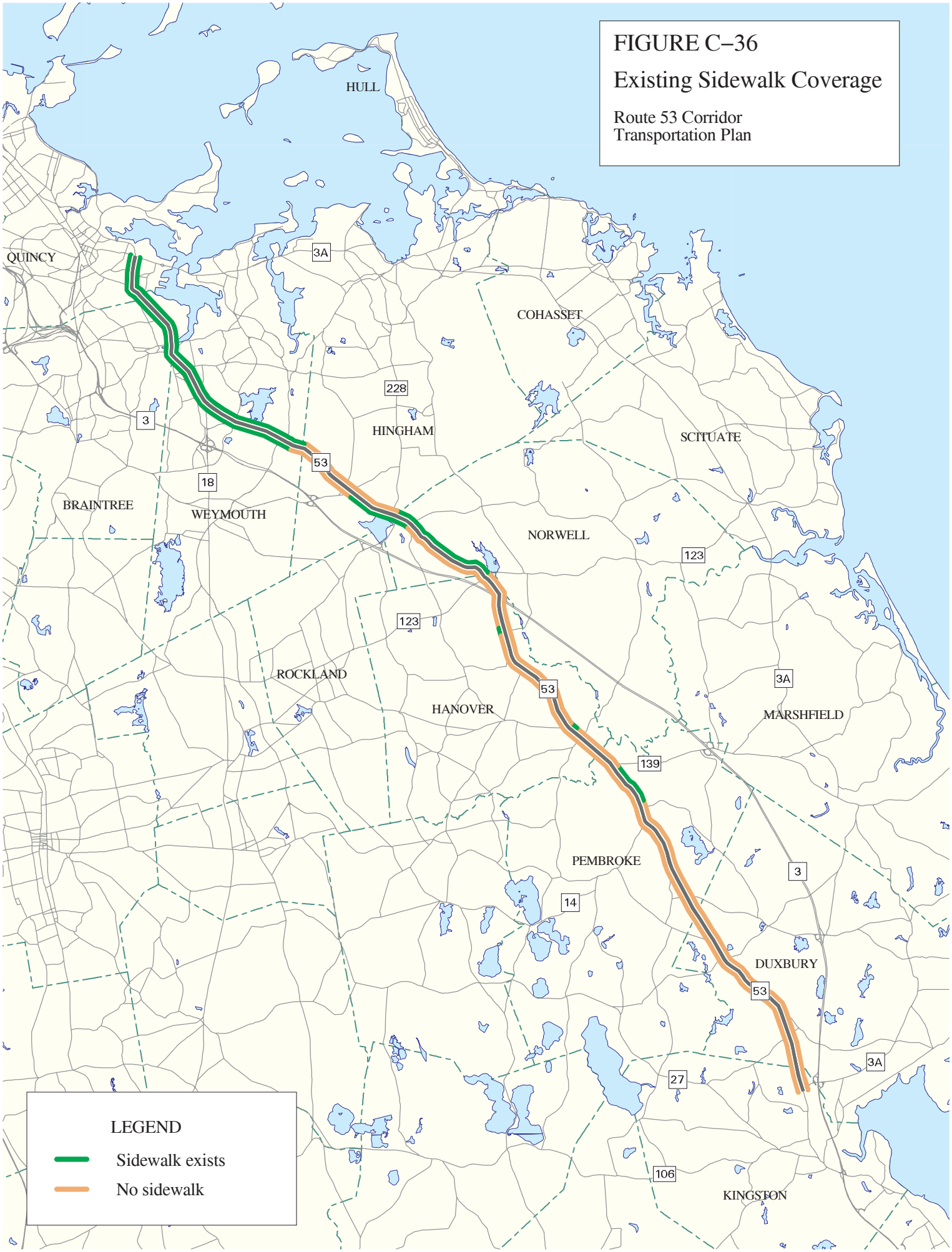


FIGURE C–36
Existing Sidewalk Coverage
Route 53 Corridor
Transportation Plan
HULL
QUINCY
3A
COHASSET
228
3
HINGHAM
SCITUATE
53
18
BRAINTREE
WEYMOUTH
NORWELL
123
123
ROCKLAND
53
3A
HANOVER
MARSHFIELD
139
PEMBROKE
3
14
DUXBURY
53
3A
27
106
KINGSTON
LEGEND
Sidewalk exists
No sidewalk

Bicycles

51 ***Striped shoulders.*** The Route 53 corridor exists in urban and suburban areas where there is no realistic opportunity to create a parallel bicycle path on an exclusive right-of-way alongside the roadway. However, MassHighway's Highway Design Manual recommends a minimum of 2.5 m (just over 8 ft)-wide shoulders on roadways classified as Urban Arterials.[57] The corridor is currently inconsistent in terms of the widths of its striped shoulders, which range from as wide as 2.5 m north of Route 18 in Weymouth, to nonexistent in Braintree and in parts of Quincy, Weymouth, Hingham, Norwell, and Hanover. In Pembroke, Duxbury, and Kingston, the shoulders are at least 0.6 m (2 ft) wide throughout.

This plan has recommended, wherever possible, wider shoulders up to 2.5 m (8 ft) on both sides of Route 53, for the entire length of the corridor (see locations #1, 3, 8, 15, 22, 31, 33, and 36 above). In addition, the Highway Design Manual states: "Bicycle lanes are portions of the roadway cross section which have been designated for the exclusive or preferential use of bicyclists. The lanes are designated by signs and pavement markings. [They] can be included in roadway cross sections with or without parking. The minimum width is 1.25 meters; greater widths are appropriate where vehicle speeds typically exceed 60 km/h" (about 40 mph).[58] The plan recommends that communities interested in adding bicycle lanes urge MassHighway to include such lanes on both sides of Route 53, conceivably in lieu of the traditional striped shoulders, to be implemented at the same time as restriping or reconstruction of the roadway.

52 ***Bicycle loop detectors, signs, markings.*** Intersection improvements at Route 53 at Route 18 in Weymouth were completed during 2002 (#10 above). As part of the improvements, bicycle loop detectors, signs, and markings were included to improve mobility for bicyclists. Similar improvements are recommended in this plan at other intersections, some already signalized, as well as some that are recommended for signalization (see locations #2, 12, 14, 28, 29, 32, and 35).

53 ***Rails with trails.*** Inactive rail lines have sometimes been converted to bicycle (and/or walking) trails (see Figure C-37). A South Shore citizens group, PATH (People for Active Transportation and Health), is urging the MBTA to investigate the feasibility of constructing a bicycle path as part of restoring the Greenbush commuter rail line. This is different from the more common "rails-to-trails" conversion; rather, it is a "rails-with-trails" concept, constructed in other parts of the U.S. This plan supports any effort to appropriately accommodate multiple travel modes within the same corridor, particularly in a right-of-way which has to a great extent remained dormant for many years. Such an integrated transportation improvement would benefit both commuter rail passengers as well as bicyclists.[59]

54 Bicycle parking. Parking facilities for bicycles are available at most South Shore commuter rail and Red Line stations. This plan supports efforts to increase the number of spaces, bicycle lockers, and other amenities at all existing stations, as well as at the new stations on the Greenbush line. These measures help to encourage bicycling and enhance the protection and safety of all bicycles and riders.

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[57] The Commonwealth of Massachusetts, op. cit., p. 5.02.0.

[58] Ibid., p. 12.02.0.

[59] The Patriot ledger, "Rail trail proposed: Bikers want to preserve riding path," October 21, 2002.

TRANSPORTATION IMPROVEMENTS OUTSIDE THE ROUTE 53 CORRIDOR

This memorandum has focused on planned, considered, and recently completed transportation improvements in the Route 53 corridor, with or without associated development projects. In addition to those discussed above, a number of transportation improvements are planned, are under consideration, or have recently been completed in the greater area surrounding the Route 53 corridor. These are shown in the table below and in Figure C-38. No details are available with respect to the improvements' respective impacts.

Summary of Transportation Improvements Outside the Route 53 Corridor (refer to Figure C-38):

Improve-ment No.	Project Description	PROJIS #	Status
1	A flyover separating Burgin Pkwy from Centre St, Quincy	603391	Listed in the current Supplemental List of Projects of the TIP
2	Quincy Center Concourse, Phase 2	601947	Listed in the current Supplemental List of Projects of the TIP
3	Replacement of the Fore River Bridge	—	Temporary bridge under construction
4	Restoration of the Greenbush CR line	—	To be completed by 2006
5	New ramps from Crown Colony Office Park to I-93 and Rt 3, Quincy	—	Under consideration
6	111 new parking spaces at North Quincy Red Line station	—	Under consideration
7	1,300 new parking spaces at Quincy Adams Red Line station	—	Under consideration
8	Traffic signal/improvements at Southern Artery/Hancock St, Quincy	602237	Listed in the current Supplemental List of Projects of the TIP
9	Reconstruction of Union St from Rt 3 rotary to Commercial St, Braintree	602593	Listed in the current Supplemental List of Projects of the TIP
10	Truck ban on Hayward St, Braintree	—	Under consideration
11	Reconstruction of Rt 18 from Rt 3 to Columbian St, Weymouth	601630	Design/permitting in FY 2004, construction during FY 2005, 2006, 2007, 2008
12	Signal improvements on Rt 18 at three intersections, Weymouth	603161	To begin during FY 2004
13	S. Weymouth Naval Air Station access road to Rt 3	—	Listed in the current Supplemental List of Projects of the TIP
14	Widening of Rt 3, Weymouth to Duxbury	—	Under consideration
15	Upgrade of Rt 228, n. Hingham to Rt 53	—	Under consideration
16	Reconstruction/signalization of Derby St from Rt 3 to Rt 53, Hingham	600518	Listed in the current Supplemental List of Projects of the TIP
17	Reconstruction of Rt 123 in Norwell from Dover St to the Scituate line	602378	Listed in the current Supplemental List of Projects of the TIP
18	Widening/reconstruction of Rt 123 in Hanover from Rockland to Norwell	600404	To begin during FY 2006
19	Construction of a bicycle/pedestrian trail on the former Old Colony line Hanover branch	—	Under consideration
20	1.6 km (1 mi) of sidewalk on Water St in Pembroke from Rt 53 to Rt 139	—	Completed
21	Construction of 1.6 km (1 mi) of sidewalks each year on local roads in Duxbury	—	Under consideration

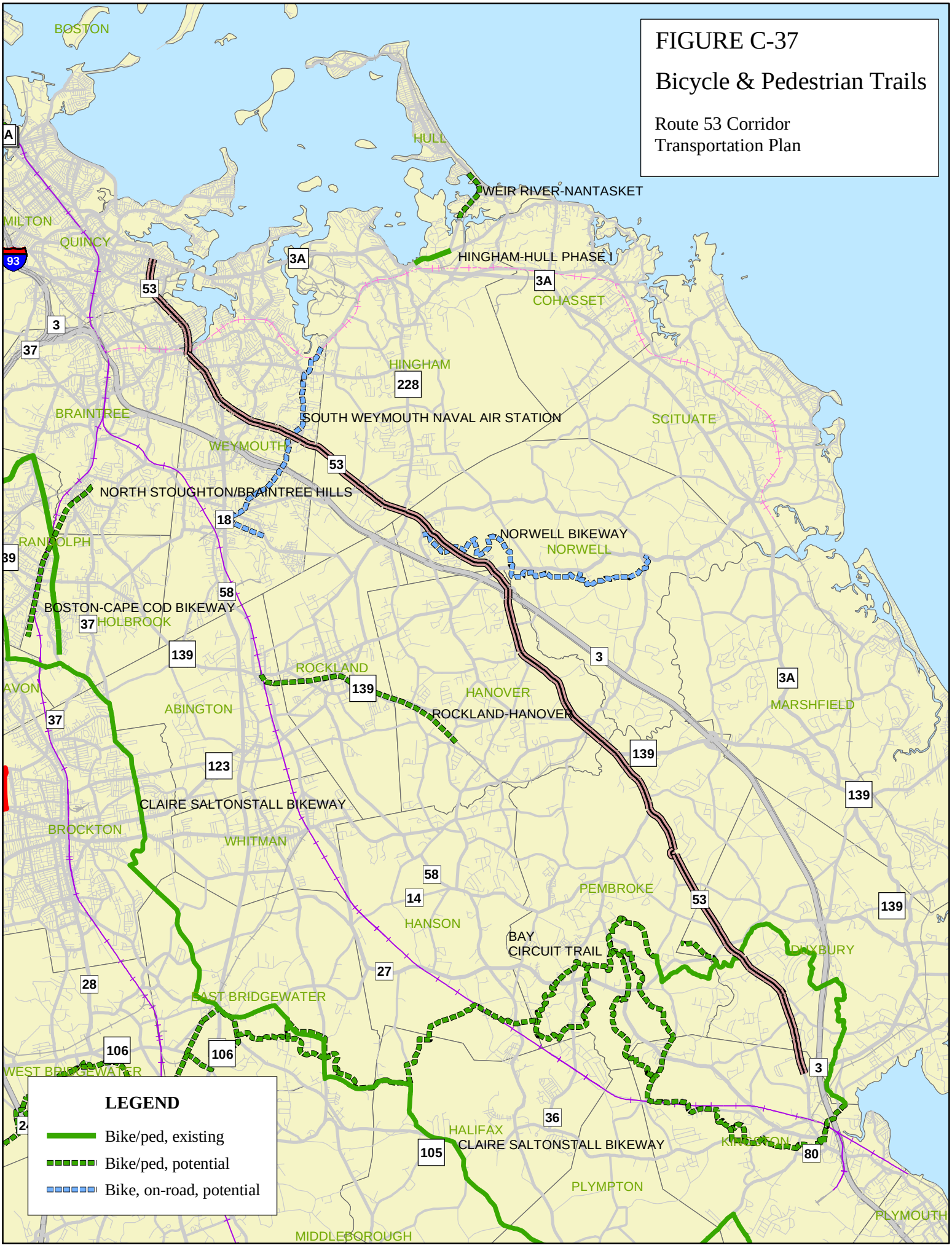
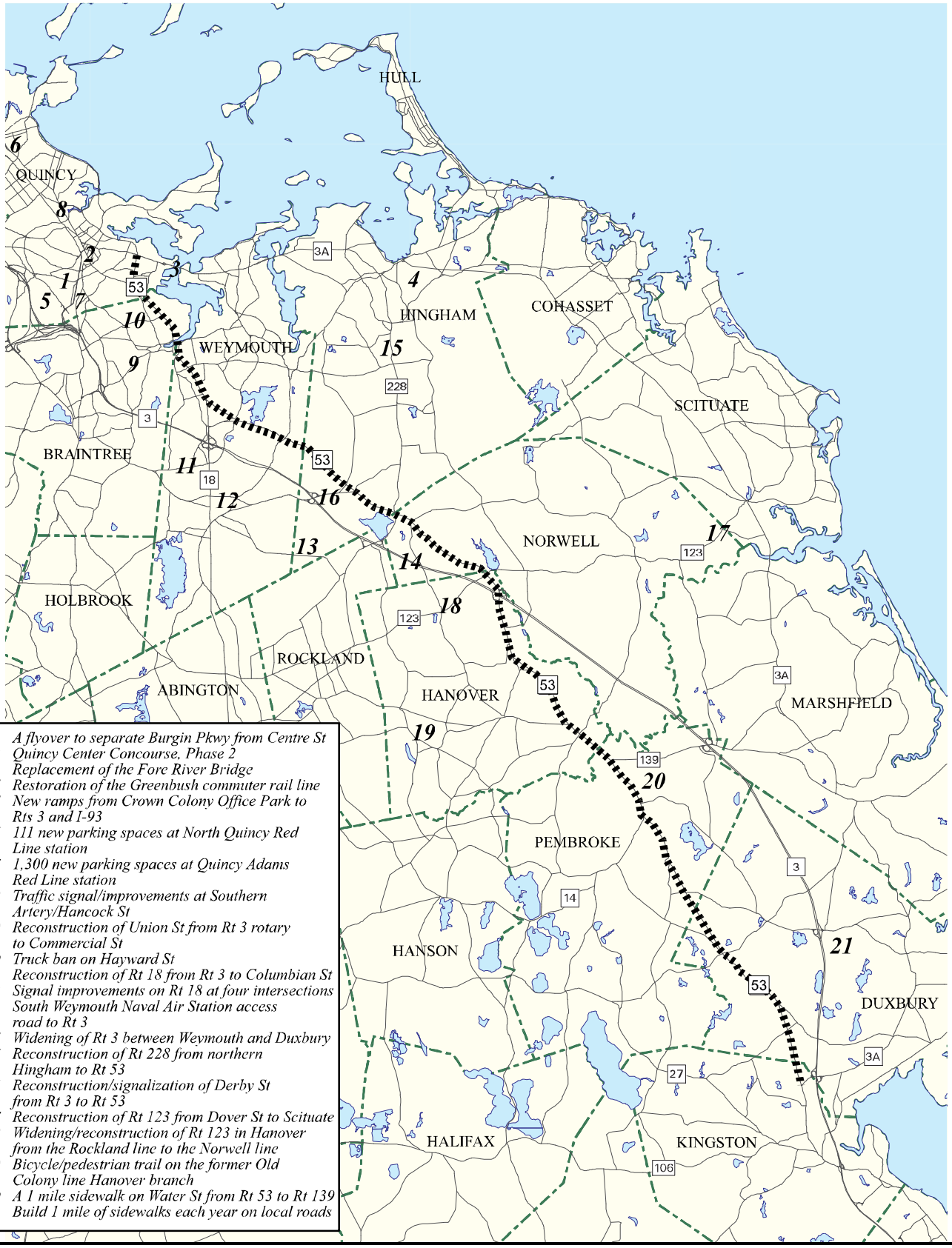


FIGURE C-37
Bicycle & Pedestrian Trails
Route 53 Corridor
Transportation Plan
BOSTON
HULL
WEIR RIVER-NANTASKET
MILTON
QUINCY
HINGHAM-HULL PHASE I
COHASSET
HINGHAM
BRAINTREE
SOUTH WEYMOUTH NAVAL AIR STATION
SCITUATE
WEYMOUTH
NORTH STOUGHTON/BRAINTREE HILLS
NORWELL BIKEWAY
NORWELL
RANDOLPH
BOSTON-CAPE COD BIKEWAY
HOLBROOK
ROCKLAND
HANOVER
ROCKLAND-HANOVER
MARSHFIELD
AVON
ABINGTON
CLAIRE SALTONSTALL BIKEWAY
BROCKTON
WHITMAN
PEMBROKE
HANSON
BAY
CIRCUIT TRAIL
DUXBURY
EAST BRIDGEWATER
WEST BRIDGEWATER
HALIFAX
CLAIRE SALTONSTALL BIKEWAY
PLYMPTON
PLYMOUTH
MIDDLEBOROUGH
LEGEND
Bike/ped, existing
Bike/ped, potential
Bike, on-road, potential



1 *A flyover to separate Burgin Pkwy from Centre St*
2 *Quincy Center Concourse, Phase 2*
3 *Replacement of the Fore River Bridge*
4 *Restoration of the Greenbush commuter rail line*
5 *New ramps from Crown Colony Office Park to Rts 3 and I-93*
6 *111 new parking spaces at North Quincy Red Line station*
7 *1,300 new parking spaces at Quincy Adams Red Line station*
8 *Traffic signal/improvements at Southern Artery/Hancock St*
9 *Reconstruction of Union St from Rt 3 rotary to Commercial St*
10 *Truck ban on Hayward St*
11 *Reconstruction of Rt 18 from Rt 3 to Columbian St*
12 *Signal improvements on Rt 18 at four intersections*
13 *South Weymouth Naval Air Station access road to Rt 3*
14 *Widening of Rt 3 between Weymouth and Duxbury*
15 *Reconstruction of Rt 228 from northern Hingham to Rt 53*
16 *Reconstruction/signalization of Derby St from Rt 3 to Rt 53*
17 *Reconstruction of Rt 123 from Dover St to Scituate*
18 *Widening/reconstruction of Rt 123 in Hanover from the Rockland line to the Norwell line*
19 *Bicycle/pedestrian trail on the former Old Colony line Hanover branch*
20 *A 1 mile sidewalk on Water St from Rt 53 to Rt 139*
21 *Build 1 mile of sidewalks each year on local roads*

CTPS

Route 53 Corridor Transportation Plan

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FIGURE C-38
Already Planned/Considered/Recently Completed Transportation Improvements Outside the Route 53 Corridor

APPENDIX C-1

Existing and Projected Traffic Volumes

Existing and Projected Traffic Volumes

South Shore communities experienced high levels of growth in population and employment between 1990 and 2000. Population in the fourteen cities and towns in the Route 53 Corridor and/or the South Shore Coalition (SSC) area combined grew by an aggregate 5.3% in the same 10-year period (323,000 to 340,000), an overall average of 0.5% per year.[1] At the same time, total employment in these communities grew by 14% (134,000 to 152,000), or 1.3% per year (see Tables C-1-1 and C-1-2).[2]

As seen from the MAPC forecasts in Table C-1-1 and Table C-1-2, it is expected that population and employment levels will continue to grow on the South Shore. Total population growth in the fourteen communities is expected to increase between 2000 and 2005 by 1.6% (0.3% per year), and by 12.2% between 2000 and 2025 (0.5% per year). Employment levels are projected to grow by 4.6% between 2000 and 2005 (0.9% per year), and by 23.4% between 2000 and 2025 (0.8% per year).

Corridor traffic levels have shown no, to moderate, growth (0 to +1.5% per year) during the past 15 years, depending on location. Available study area traffic volumes on Route 53 reveal a range of average daily traffic (ADT) of 6,000 to about 30,000. Although there is a scarcity of recent ADT counts in the corridor at the same locations, the following table summarizes some of the trends in daily volumes, from north to south.

Location	Year	ADT	
1. Quincy, Route 53 north of Howard Street	1987	20,500 \	(+1.0% per year)
	1999	23,200 /	
2. Hingham, Route 53 east of the Weymouth line	1985	11,300 \	
(continuous MassHighway counting station #28)	1990	11,700	(no
	1995	11,400	growth)
	1999	11,100 /	
3. Hingham, Route 53 north of Route 228	1999	20,300	
4. Norwell, Route 53 south of Route 228	1987	26,200 \	
	1988	27,500	(+1.5% per year)
	1994	29,000 /	
5. Hanover, Route 53/Route 139 at the Pembroke line	1988	28,700 \	
	1991	27,000	(+0.8% per year)
	1992	26,800	
	1994	30,000 /	
6. Pembroke, Route 53 at the Duxbury line	1985	6,300 \	
	1990	5,700	(no growth)
	1997	6,000 /	
Included as a reference of traffic growth near Route 53:			
7. Hanover, Route 139 west of Route 53	1985	11,800 \	
(continuous MassHighway counting station #29)	1989	12,500	(+1.2% per year)
	1993	12,900 /	

(Sources: 1–5, 7, MassHighway Traffic Volumes; 6, Old Colony Planning Council)

[1] The SSC is one of eight subregions of the Metropolitan Area Planning Council (MAPC).

[2] Sources: the Web sites of Massachusetts Executive Office of Environmental Affairs (EOEA)/Community Preservation (http://commpres.env.state.ma.us); MAPC/Census Demographic Profiles (www.mapc.org, July 2001).

TABLE C-1-1
Projected Growth in Population in the Route 53 Corridor: 2000 to 2005 and 2020

City/ Town	(US Census) 2000	Change per Year from '90	2005	Change per Year from '00	2025	Change per Year from '00	Estimated Buildout	Change/Year from '00 to '25 (Revised)
			Projected Population (based on MAPC trends)					
Study Area Communities								
Quincy	88,025	0.4%	88,722	0.2%	91,217	0.1%	89,752	0.1%
Braintree	33,828	0.0%	33,704	-0.1%	35,664	0.2%	35,367	0.2%
Weymouth	53,988	0.0%	53,514	-0.2%	55,125	0.1%	59,515	--
Hingham	19,882	0.0%	20,298	0.4%	22,664	0.5%	23,390	--
Norwell	9,765	0.5%	9,888	0.3%	11,127	0.5%	16,686	--
Hanover	13,164	1.0%	13,820	1.0%	16,994	1.0%	19,958	--
Pembroke	16,927	1.5%	17,702	0.9%	22,213	1.1%	21,610	1.0%
Duxbury	14,248	0.3%	15,030	1.1%	18,673	1.1%	23,258	--
Kingston	11,780	2.7%	12,834	1.7%	17,037	1.5%	18,182	--
TOTAL	261,607	0.4%	265,513	0.3%	290,714	0.4%	307,718	
Other South Shore Communities								
Cohasset	7,261	0.3%	7,359	0.3%	8,332	0.6%	9,913	--
Hull	11,050	0.5%	11,414	0.6%	13,010	0.7%	11,777	0.3%
Marshfield	24,324	1.2%	24,965	0.5%	28,978	0.7%	29,287	--
Rockland	17,670	0.9%	18,062	0.4%	20,660	0.6%	20,875	--
Scituate	17,863	0.6%	17,941	0.1%	19,444	0.3%	25,347	--
TOTAL	78,168	0.8%	79,741	0.4%	90,424	0.6%	97,199	
GRAND TOTAL	339,775	0.5%	345,254	0.3%	381,138	0.5%	404,917	

(Sources:
o Community buildout info.: commpres.env.state.ma.us/ (no www.) Click on 'Choose a Community.' Near the bottom of each town page click on 'Map 3: Composite Map.' Buildout info. is shown.

o Pop. info.: mapc.org. Click on Metro Data Center, Census Demographic Profiles 1990 and 2000, as 'forecasts' near the top.)

TABLE C-1-2
Projected Growth in Employment in the Route 53 Corridor: 2000 to 2005 and 2020

City/ Town	2000 (estimated)	Change per Year from '90	2005	Change per Year from '00	2025	Change per Year from '00	Estimated Buildout	Change/Year from '00 to '25 (Revised)
	Projected Employment (based on MAPC trends)							
Study Area Communities								
Quincy	46,567	1.5%	48,625	0.9%	59,030	1.0%	52,646	0.5%
Braintree	30,319	0.2%	31,157	0.5%	35,571	0.6%	44,232	--
Weymouth	16,593	1.3%	17,129	0.6%	19,973	0.7%	39,125	--
Hingham	11,078	1.3%	11,302	0.4%	12,559	0.5%	16,513	--
Norwell	9,167	5.2%	10,800	3.3%	13,519	1.6%	10,854	0.7%
Hanover	6,378	-0.3%	6,463	0.3%	6,990	0.4%	12,275	--
Pembroke	4,772	2.2%	5,118	1.4%	6,471	1.2%	6,956	--
Duxbury	2,546	1.2%	2,637	0.7%	3,039	0.7%	2,640	0.1%
Kingston	5,633	1.9%	6,026	1.4%	7,127	0.9%	19,627	--
TOTAL	133,053	1.3%	139,257	0.9%	164,279	0.8%	204,868	
Other South Shore Communities								
Cohasset	1,994	-0.1%	2,020	0.3%	2,195	0.4%	5,059	--
Hull	1,207	1.1%	1,210	0.0%	1,252	0.1%	4,647	--
Marshfield	4,671	1.1%	4,821	0.6%	5,578	0.7%	23,318	--
Rockland	8,276	2.2%	8,886	1.4%	11,076	1.2%	19,821	--
Scituate	3,161	0.8%	3,241	0.5%	3,674	0.6%	4,044	--
TOTAL	19,309	1.4%	20,178	0.9%	23,775	0.8%	56,889	
GRAND TOTAL	152,362	1.3%	159,435	0.9%	188,054	0.8%	261,757	

(Sources:
o Community buildout info.: commpres.env.state.ma.us/ (no www.) Click on 'Choose a Community.' Near the bottom of each town page click on 'Map 3: Composite Map.' Buildout info. is shown.

o Empl. info.: mapc.org. Click on Metro Data Center, Census Demographic Profiles 1990 and 2000, as 'forecasts' near the top.)

It can be seen from the ADT data at the continuous station in Hingham (count #2) that volumes near the Weymouth/Hingham line are the lowest in the northern part of the study area, and have been stable for many years. The lowest volumes in the southern part are at the Pembroke-Duxbury line (#6). Route 53 volumes near Route 228, at the Hingham/Norwell line (#4), are higher and have shown some growth between the late 1980s and the mid-1990s. This area, known as Queen Anne's Corner, has experienced increased development, primarily retail, during the past decade. Further south, on Route 53/Route 139 at the Hanover/Pembroke line (#5), daily traffic volumes are also among the highest in the corridor, and grew by less than one percent per year between 1988 and 1994.

Based on the population and employment forecasts, and on the historical daily traffic data, it is expected that traffic in the Route 53 corridor and the South Shore communities will continue to grow as well. However, it is expected that the rate of growth will not be uniform throughout the 35.6 km (22.1 mi) corridor. Since the communities closer to Boston have been growing at lower rates than those further to the south (see Tables C-1-1 and C-1-2), this plan assumes, based on the available information, that there will be an average of *0.5% per year* growth in Route 53 corridor daily traffic in the northern four communities (*Quincy, Braintree, Weymouth,* and *Hingham*). In the southern five communities (*Norwell, Hanover, Pembroke, Duxbury,* and *Kingston*), it is assumed that daily traffic in the corridor will grow by an average of *1% per year*. These yearly growth rates are assumed both between 2000 and 2005, and between 2000 and 2025.

This plan has assumed the same 0.5% and 1% per year growth for the AM and PM peak hours, respectively, for the purpose of intersection LOS analysis. These rates may in fact be conservative, since traffic levels are already at or near capacity at a number of Route 53 intersections. The transportation improvements recommended in this plan were analyzed for operational LOS using the projected Route 53 traffic volumes, grown at these rates. Refer specifically to the following locations in Appendix C above:

- Location 2, Route 53 at East/West Howard Street, Quincy, p. 4
- Location 11, Route 53 at Middle Street, Weymouth, p. 18
- Location 12, Route 53 at Pleasant Street, Weymouth, p. 20
- Location 14, Route 53 at Derby Street/Gardner Street, Hingham, p. 26
- Location 28, Route 53 at East Street, Hanover, p. 54
- Location 29, Route 53 at Broadway, Hanover, p. 56
- Location 32, Route 53 at Pleasant Street, Pembroke, p. 63
- Location 35, Route 53 at Winter Street, Duxbury, p. 66
- Location 38, Route 53 at Tar Kiln Road/CVS driveway, Kingston, p. 73
- Location 39, Route 53 at Route 3A, Kingston, p. 76

Figures C-1-1, C-1-2, and C-1-3 show existing and projected turning movement volumes for 2000, 2005, 2025, respectively, for key Route 53 intersections.

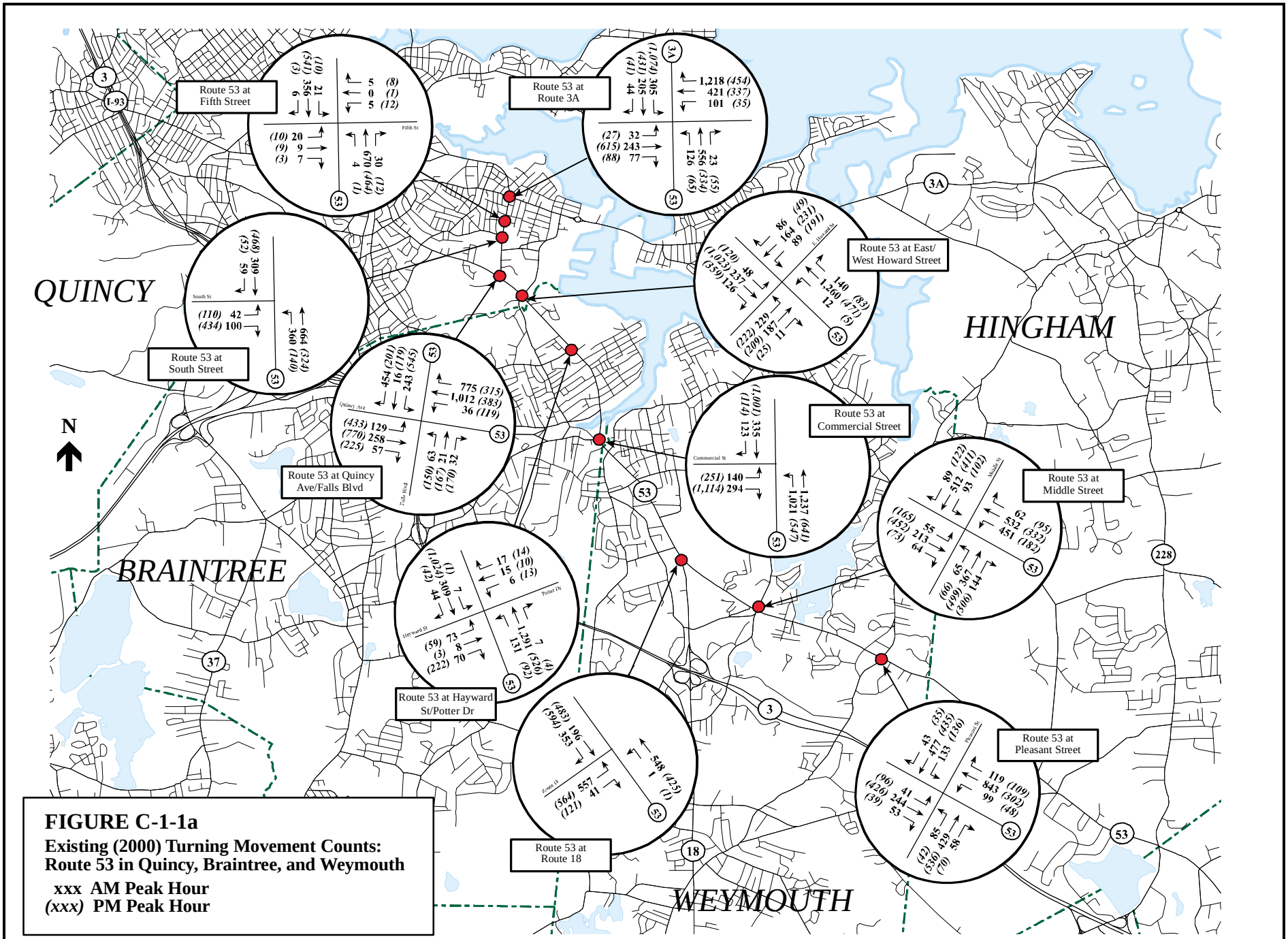


FIGURE C-1-1a
Existing (2000) Turning Movement Counts: Route 53 in Quincy, Braintree, and Weymouth
xxx AM Peak Hour
***(xxx)* PM Peak Hour**

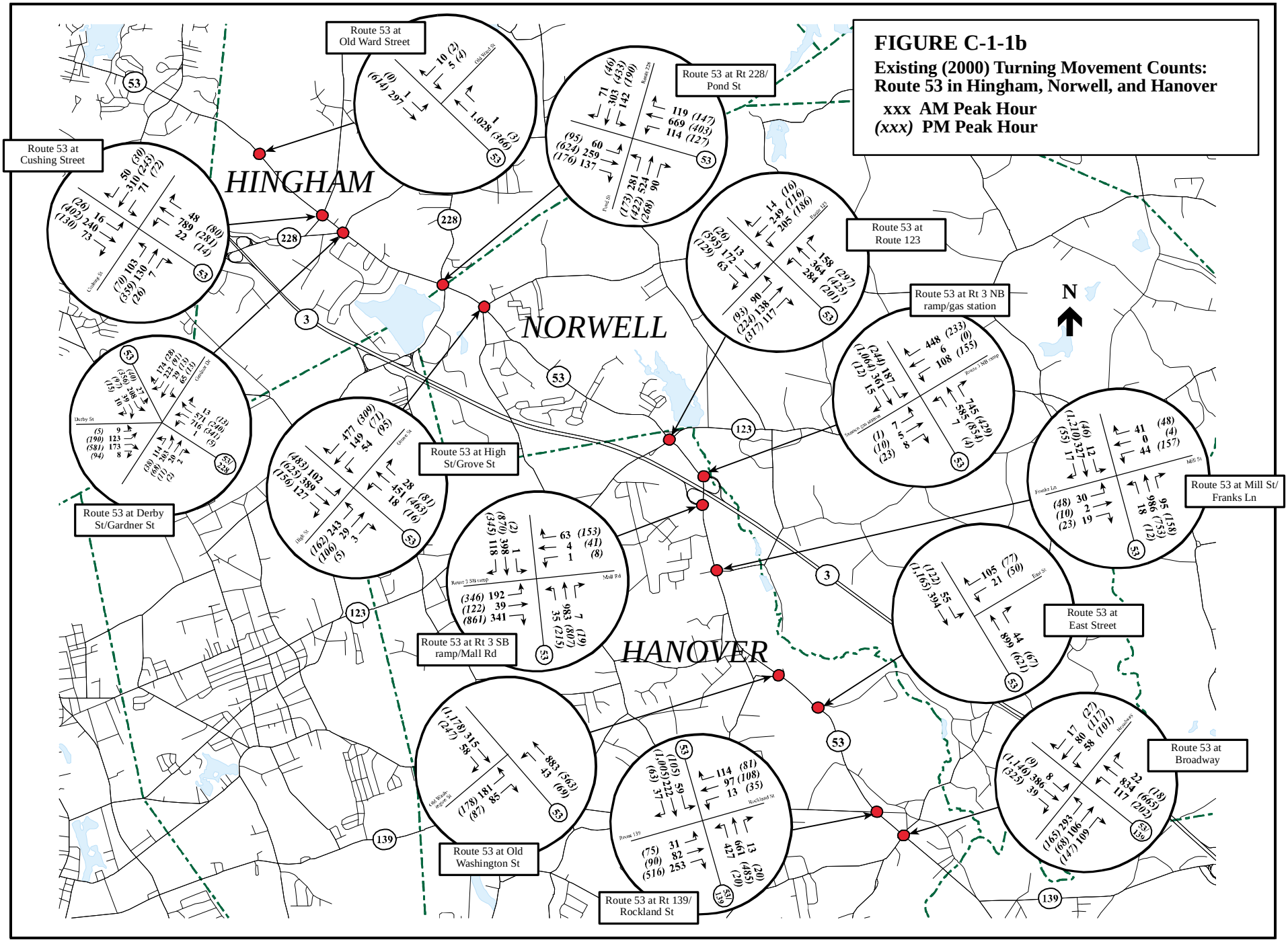


FIGURE C-1-1b
Existing (2000) Turning Movement Counts:
Route 53 in Hingham, Norwell, and Hanover
xxx AM Peak Hour
(xxx) PM Peak Hour
HINGHAM
NORWELL
HANOVER
N
Route 53 at Old Ward Street
Route 53 at Rt 228/ Pond St
Route 53 at Cushing Street
Route 53 at Route 123
Route 53 at Rt 3 NB ramp/gas station
Route 53 at High St/Grove St
Route 53 at Derby St/Gardner St
Route 53 at Mill St/ Franks Ln
Route 53 at Rt 3 SB ramp/Mall Rd
Route 53 at East Street
Route 53 at Broadway
Route 53 at Old Washington St
Route 53 at Rt 139/ Rockland St

CTPS **Route 53 Corridor Transportation Plan**

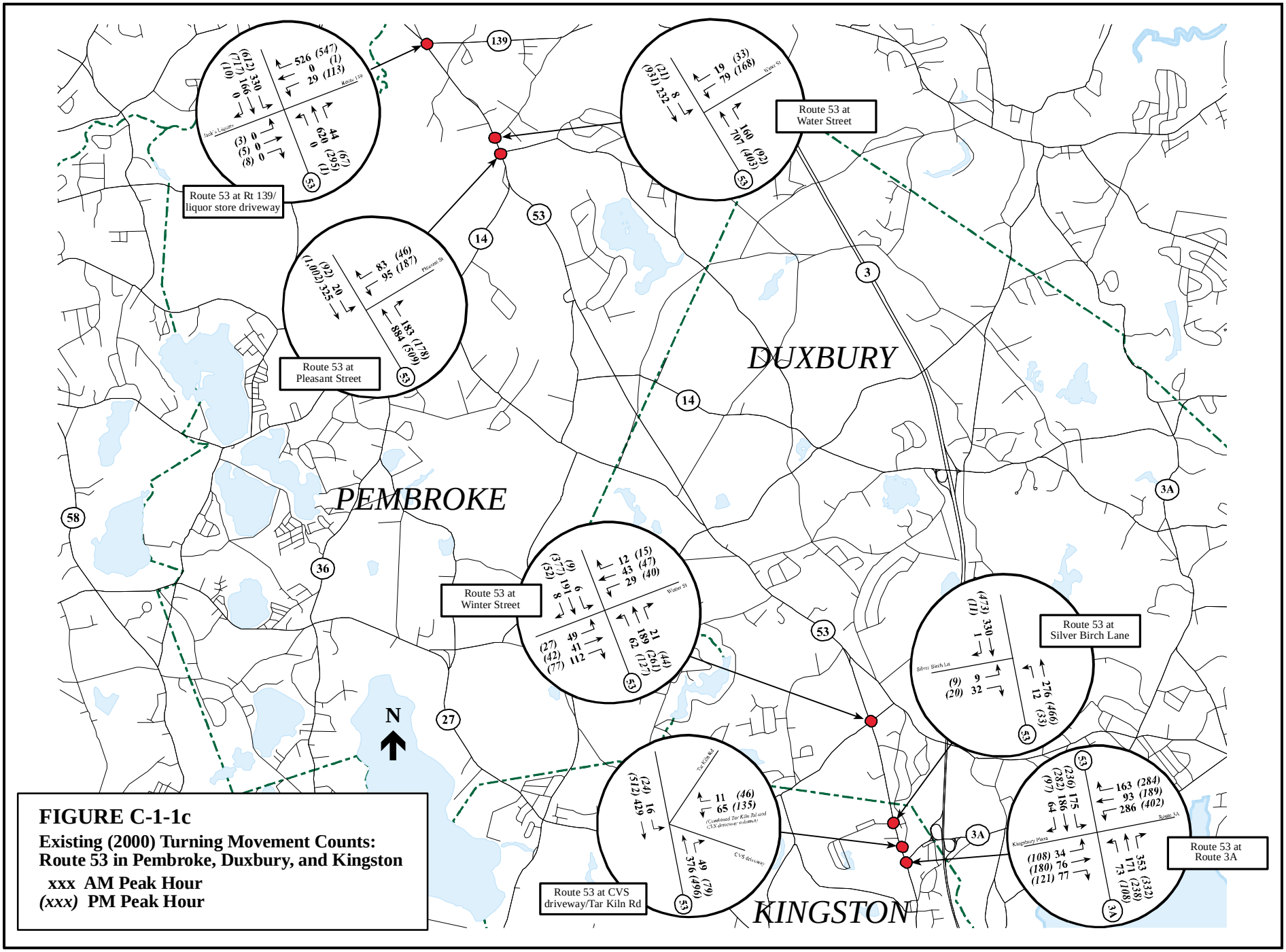
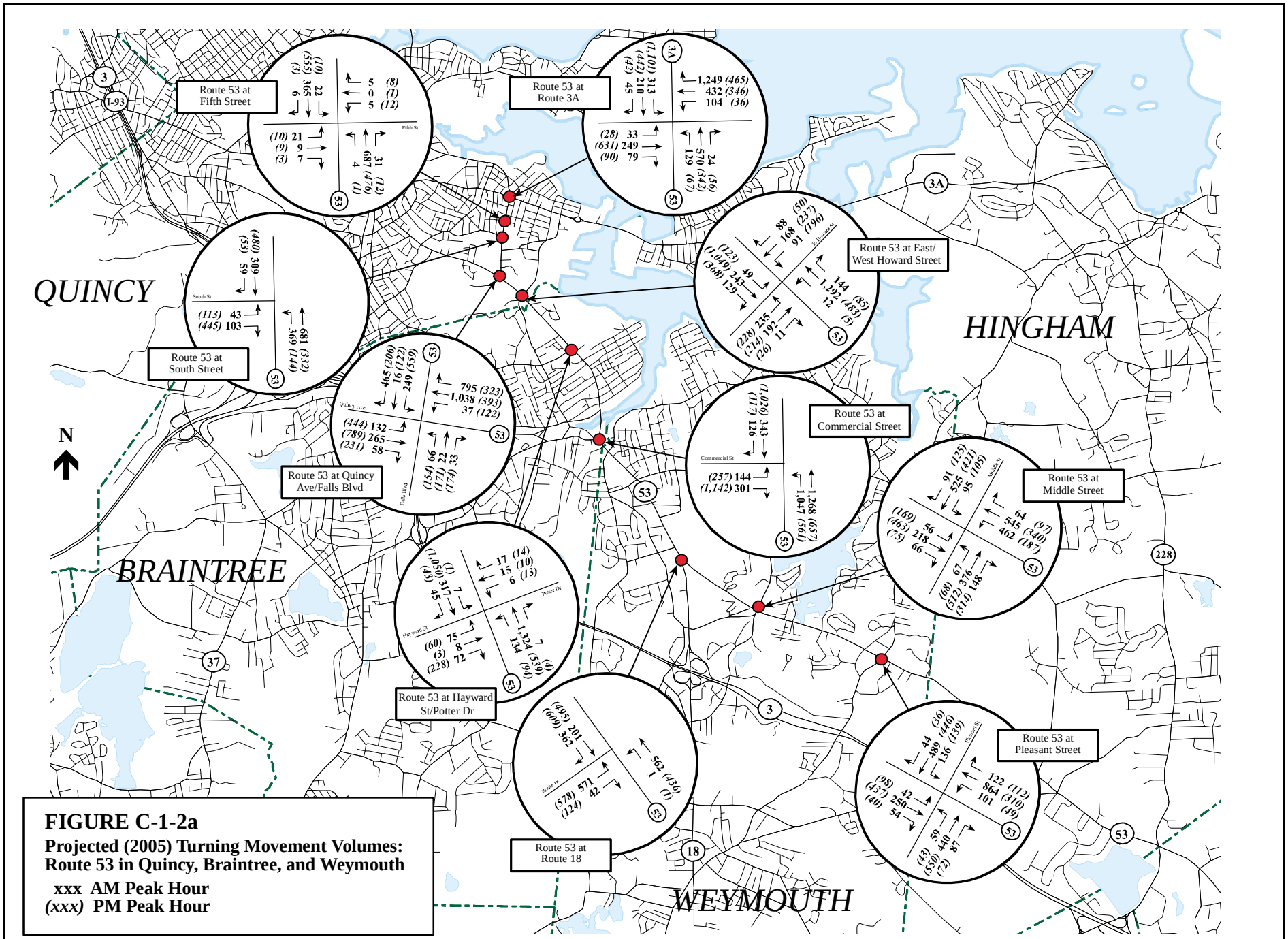


FIGURE C-1-1c
Existing (2000) Turning Movement Counts: Route 53 in Pembroke, Duxbury, and Kingston
xxx AM Peak Hour
***(xxx)* PM Peak Hour**


Route 53 at Fifth Street
Route 53 at Route 3A
Route 53 at East/ West Howard Street
Route 53 at South Street
Route 53 at Quincy Ave/Falls Blvd
Route 53 at Commercial Street
Route 53 at Middle Street
Route 53 at Hayward St/Potter Dr
Route 53 at Pleasant Street
Route 53 at Route 18
QUINCY
HINGHAM
BRAINTREE
WEYMOUTH
N
FIGURE C-1-2a
Projected (2005) Turning Movement Volumes: Route 53 in Quincy, Braintree, and Weymouth
xxx AM Peak Hour
(xxx) PM Peak Hour

CTPS *Route 53 Corridor Transportation Plan*

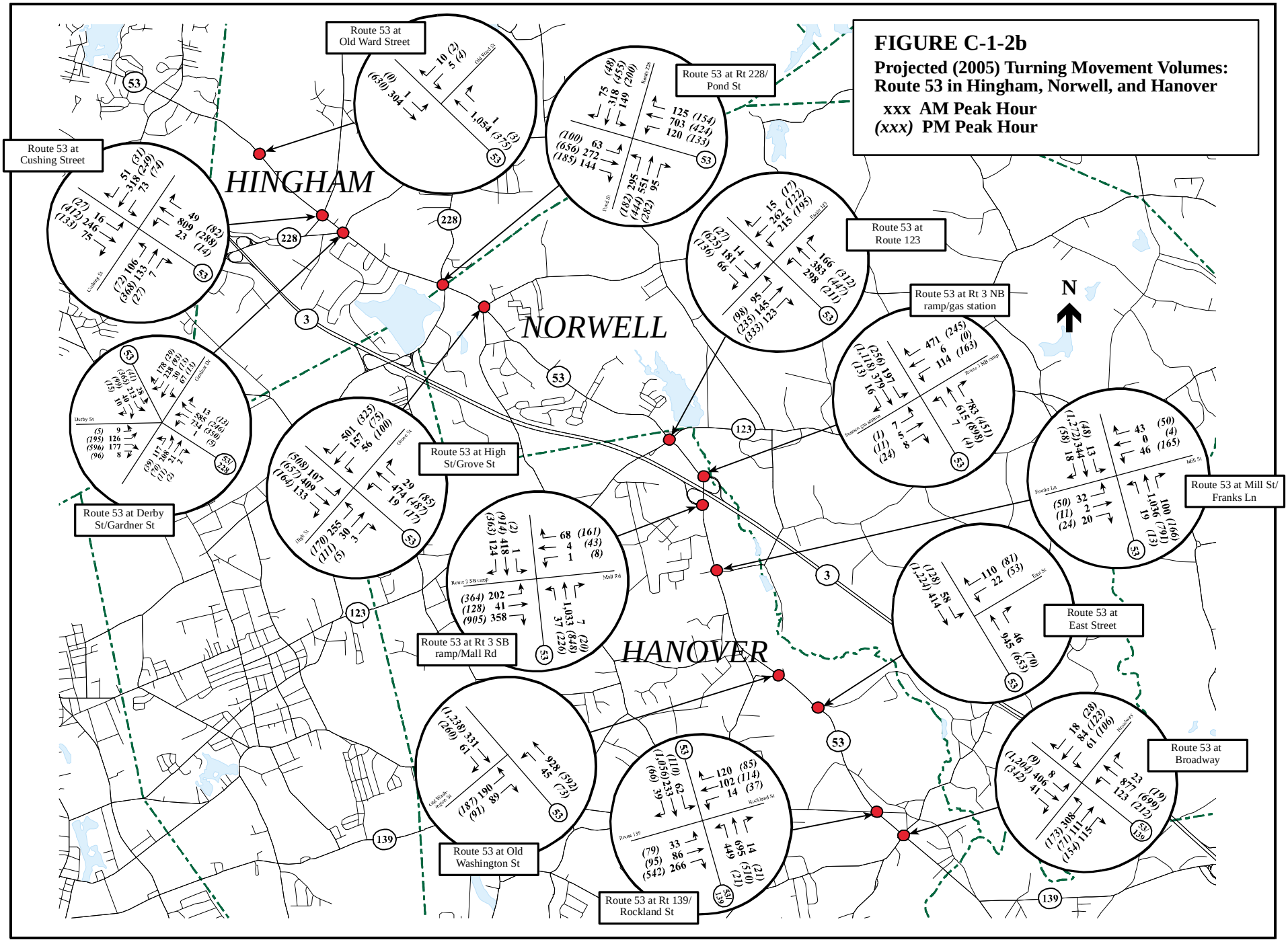


FIGURE C-1-2b
Projected (2005) Turning Movement Volumes:
Route 53 in Hingham, Norwell, and Hanover
xxx AM Peak Hour
(xxx) PM Peak Hour
HINGHAM
NORWELL
HANOVER
N
Route 53 at Old Ward Street
Route 53 at Rt 228/ Pond St
Route 53 at Cushing Street
Route 53 at Route 123
Route 53 at Rt 3 NB ramp/gas station
Route 53 at Derby St/Gardner St
Route 53 at High St/Grove St
Route 53 at Mill St/ Franks Ln
Route 53 at Rt 3 SB ramp/Mall Rd
Route 53 at East Street
Route 53 at Broadway
Route 53 at Old Washington St
Route 53 at Rt 139/ Rockland St

CTPS **Route 53 Corridor Transportation Plan**

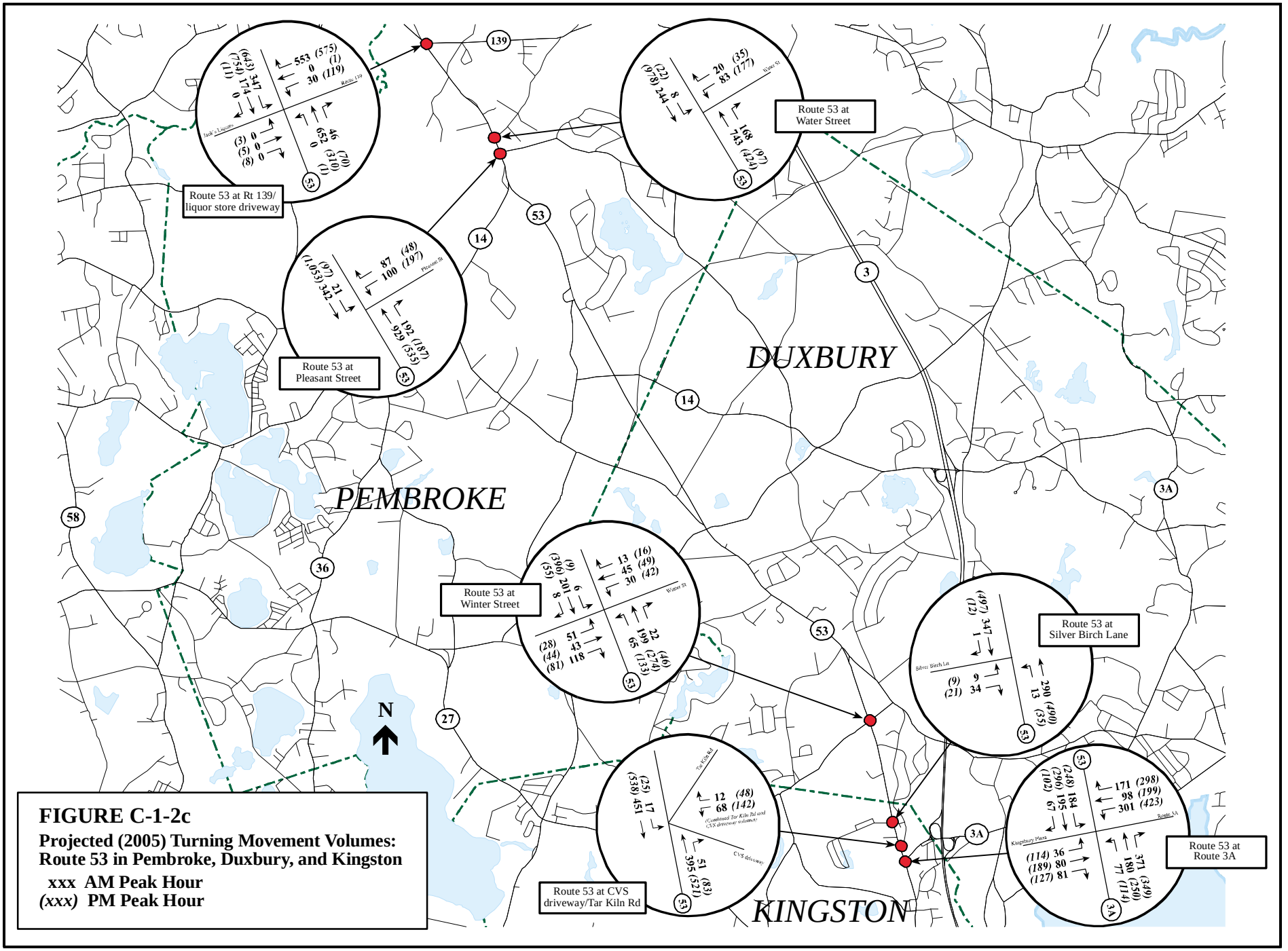
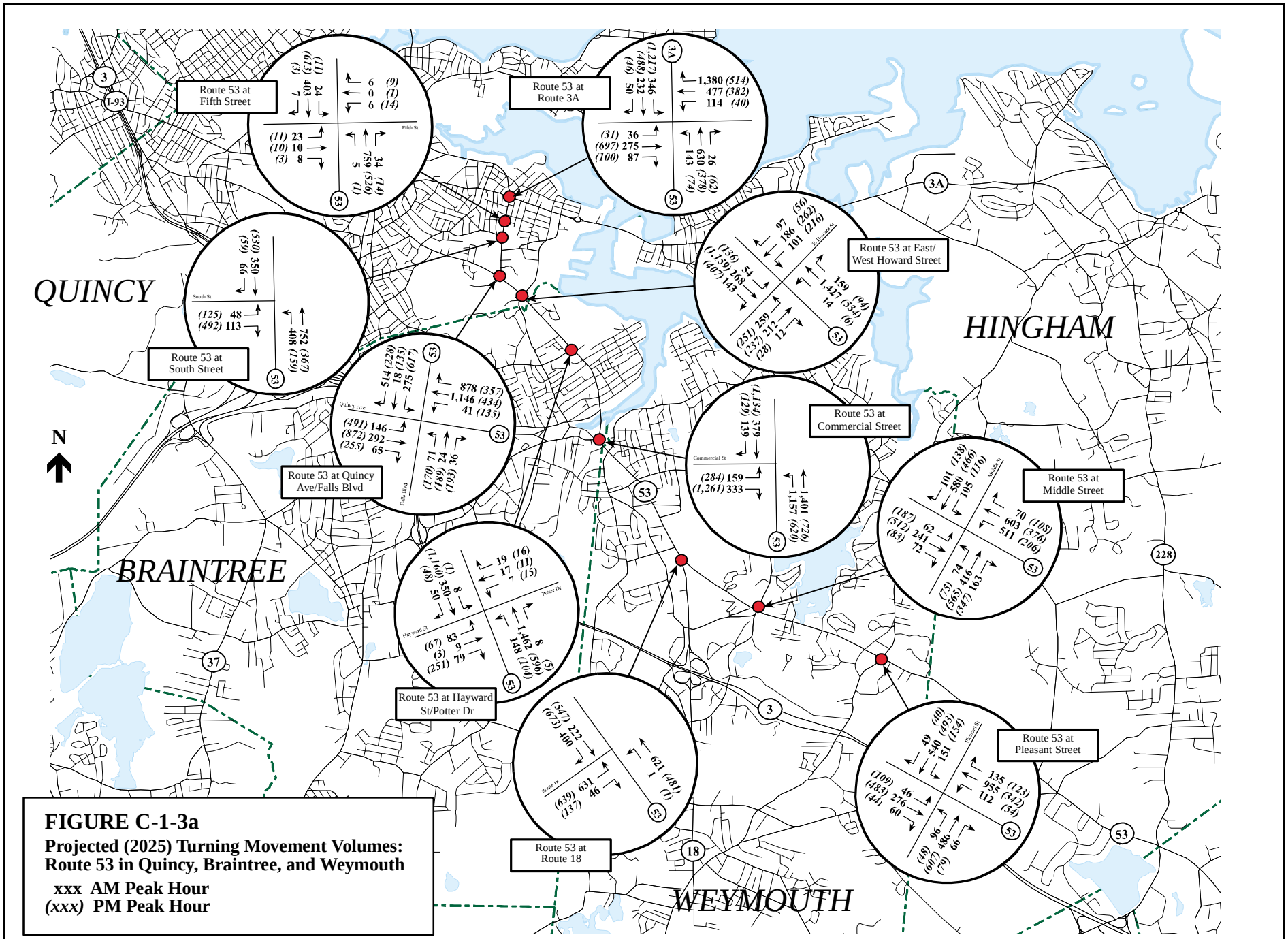

Route 53 at Rt 139/ liquor store driveway
Route 53 at Water Street
Route 53 at Pleasant Street
Route 53 at Winter Street
Route 53 at Silver Birch Lane
Route 53 at CVS driveway/Tar Kiln Rd
Route 53 at Route 3A
PEMBROKE
DUXBURY
KINGSTON
N

FIGURE C-1-2c

Projected (2005) Turning Movement Volumes: Route 53 in Pembroke, Duxbury, and Kingston

xxx AM Peak Hour

***(xxx)* PM Peak Hour**



CTPS *Route 53 Corridor Transportation Plan*

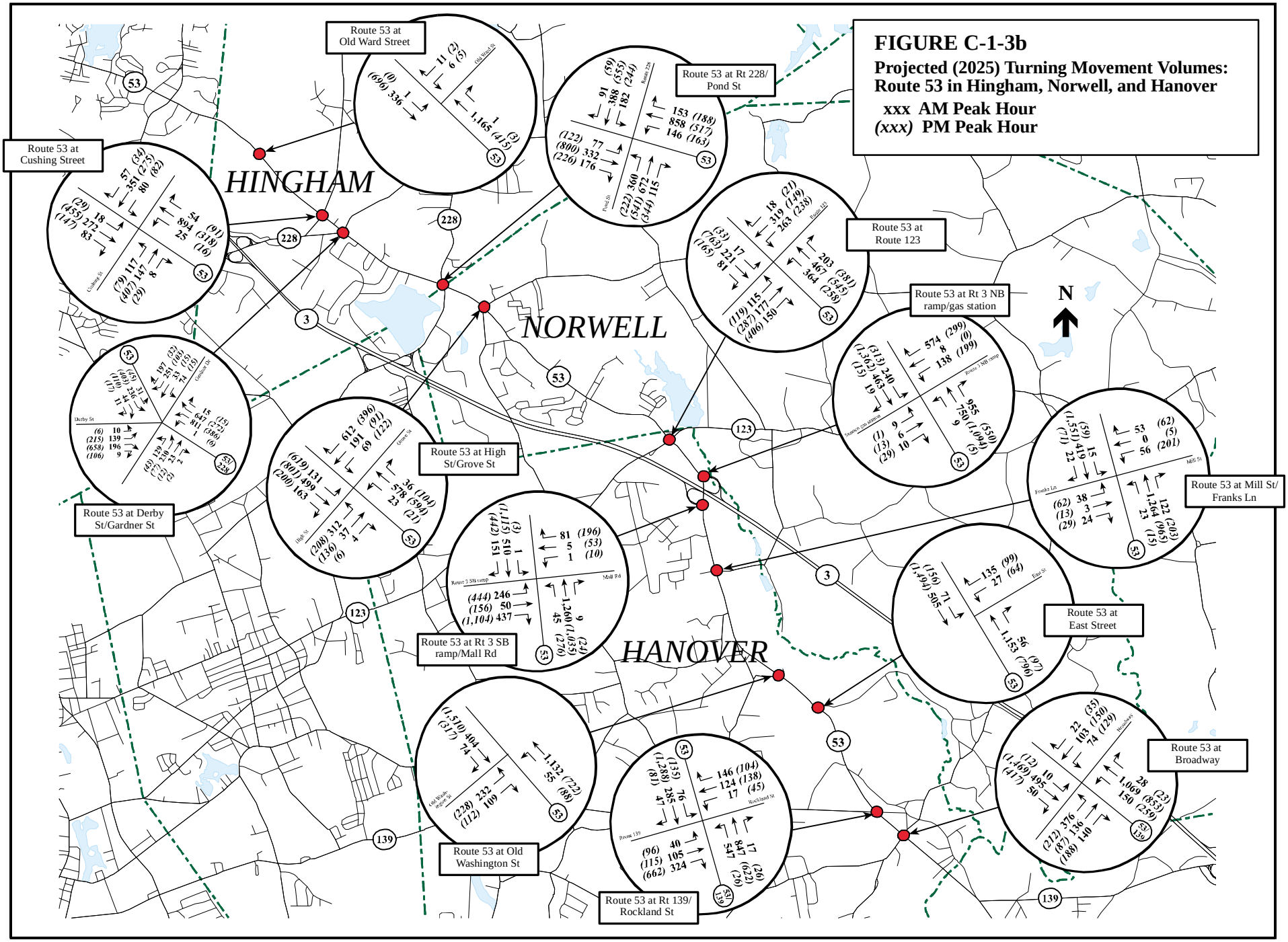


FIGURE C-1-3b
Projected (2025) Turning Movement Volumes: Route 53 in Hingham, Norwell, and Hanover
xxx AM Peak Hour
(xxx) PM Peak Hour
HINGHAM
NORWELL
HANOVER
N
Route 53 at Old Ward Street
Route 53 at Rt 228/ Pond St
Route 53 at Cushing Street
Route 53 at Route 123
Route 53 at Rt 3 NB ramp/gas station
Route 53 at High St/Grove St
Route 53 at Derby St/Gardner St
Route 53 at Mill St/ Franks Ln
Route 53 at Rt 3 SB ramp/Mall Rd
Route 53 at East Street
Route 53 at Broadway
Route 53 at Old Washington St
Route 53 at Rt 139/ Rockland St

CTPS **Route 53 Corridor Transportation Plan**

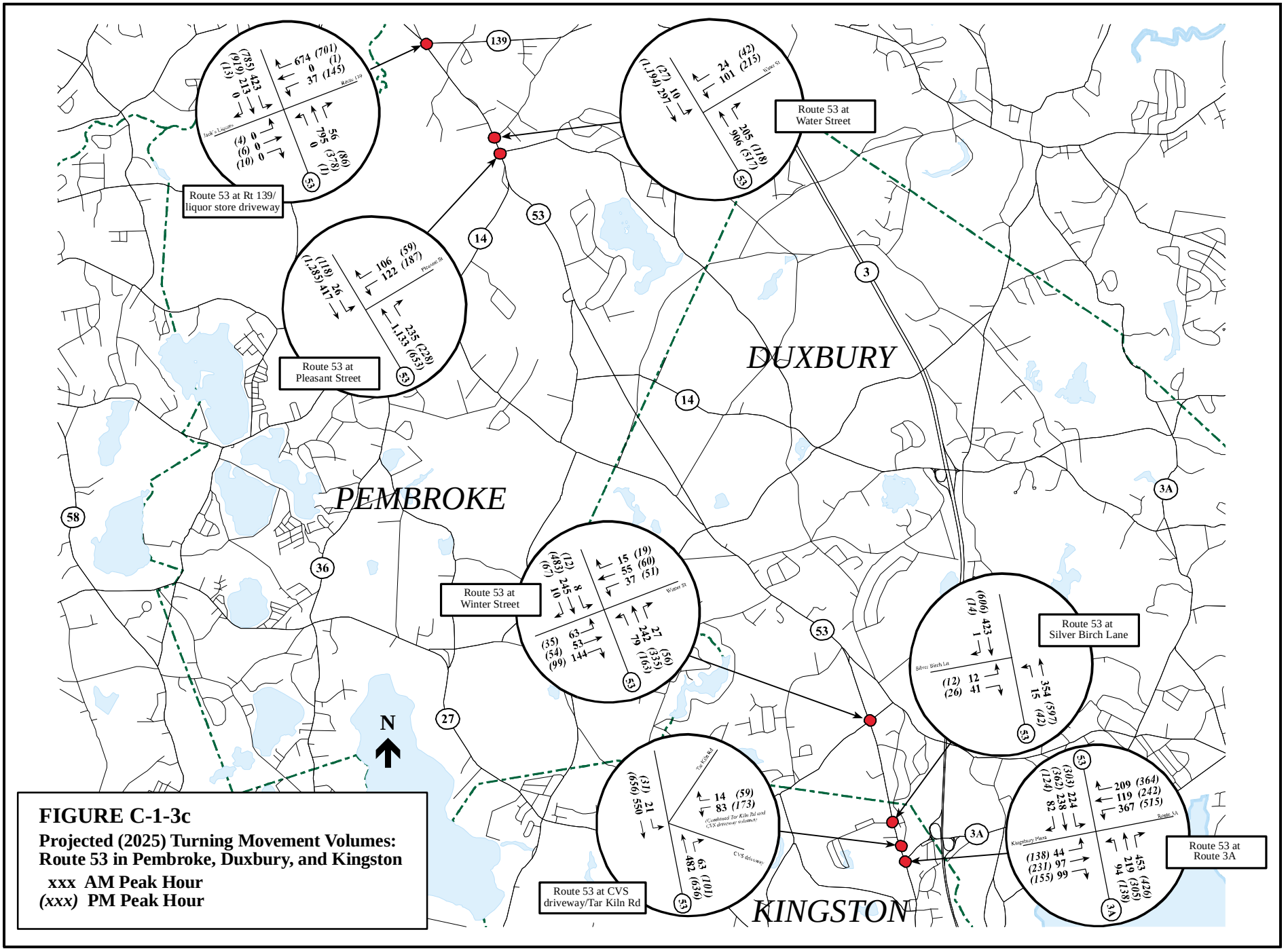

Route 53 at Rt 139/ liquor store driveway
Route 53 at Water Street
Route 53 at Pleasant Street
Route 53 at Winter Street
Route 53 at Silver Birch Lane
Route 53 at CVS driveway/Tar Kiln Rd
Route 53 at Route 3A
DUXBURY
PEMBROKE
KINGSTON
N

FIGURE C-1-3c
Projected (2025) Turning Movement Volumes: Route 53 in Pembroke, Duxbury, and Kingston
xxx AM Peak Hour
***(xxx)* PM Peak Hour**

APPENDIX C-2

Traffic Calming Measures
(Neighborhood Traffic Circles, Speed Tables)

Calming Measures
Library
Seminar Materials
Selected Reports
Other Links
Home

Traffic Calming Measures - Neighborhood Traffic Circle

Description:

- raised islands, placed in intersections, around which traffic circulates
- motorists yield to motorists already in the intersection
- require drivers to slow to a speed that allows them to comfortably maneuver around them
- sometimes called intersection islands
- different from roundabouts

U.S. Department of Transportation
Federal Highway Administration

Applications:

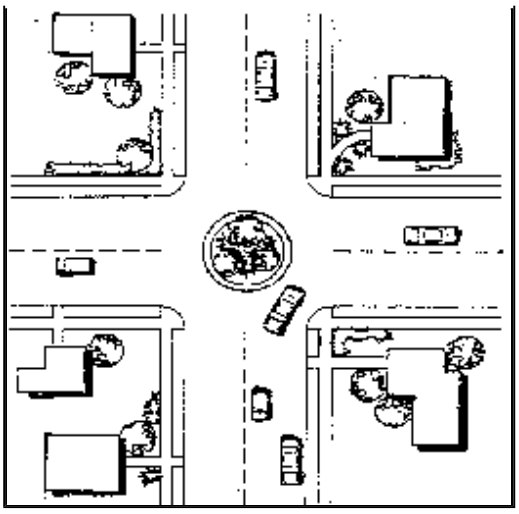
- intersections of local or collector streets
- one lane each direction entering intersection
- not typically used at intersections with high volume of large trucks and buses turning left

1099 14th Street, NW,
Suite 300 West
Washington, DC
20005-3538 USA
Phone: 202-289-0222
Fax: 202-289-7722
Send comments to:
website@ite.org

Design/Installation Issues:

- typically circular in shape, though not

always
- usually landscaped in their center islands, though not always
- often controlled by YIELD signs on all approaches, but many different signage approaches have been used
- key design features are the offset distance (distance between projection of street curb and center island), lane width for circling the circle, the circle diameter, and height of mountable outer ring for large vehicles such as school buses and trash trucks



Potential Impacts:

- no effect on access
- reduction in midblock speed of about 10 percent; area of influence tends to be a couple hundred feet upstream and downstream of intersection
- only minimal diversion of traffic
- intersection collisions have been reduced on average by 70 percent and overall collisions by 28 percent
- can result in bicycle/auto conflicts at intersections because of narrowed travel lane

Emergency Response Issues:

- emergency vehicles typically slow to approximately 13 mph; approximate delay of between 5 and 8 seconds per circle for fire trucks
- fire trucks can maneuver around traffic circles at slow speeds provided vehicles are not parked near the circle

Other/Special Considerations:

- large vehicles may need to turn left in front of the circle (which could be unsafe at higher volumes); legislation may be required to legally permit this movement
- quality of landscaping and its maintenance are key issues
- landscaping needs to be designed to allow adequate sight distance
- care must be taken to avoid routing vehicles through unmarked crosswalks on side-street approach

Typical Cost:

- approximately $3,500 to $15,000 (1997 dollars)

Calming Measures
Library
Seminar Materials
Selected Reports
Other Links
Home

Traffic Calming Measures - Speed Table

Description:

- long raised speed humps with a flat section in the middle and ramps on the ends; sometimes constructed with brick or other textured materials on the flat section
- sometimes called flat top speed humps, trapezoidal humps, speed platforms, raised crosswalks, or raised crossings

Applications:

- local and collector streets
- main roads through small communities
- typically long enough for the entire wheelbase of a passenger car to rest on top
- work well in combination with textured crosswalks, curb extensions, and curb radius reductions
- can include a crosswalk

U.S. Department of Transportation
Federal Highway Administration

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Suite 300 West
Washington, DC
20005-3538 USA
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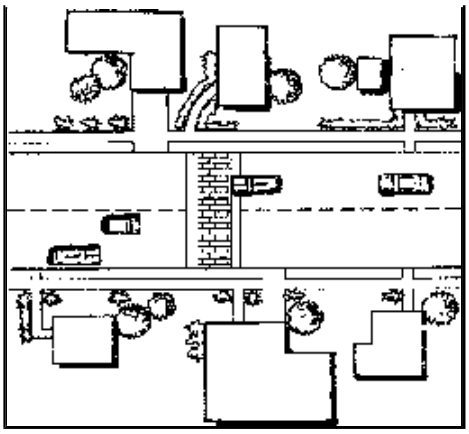
Send comments to:
website@ite.org

Design/Installation Issues:

- typically 22 feet in the direction of travel with 6 foot ramps on each end and a 10 foot flat section in the middle; other lengths (32 and 48 feet) reported in U.S. practice
- most common height is between 3 and 4 inches (and reported as high as 6 inches)
- ramps are typically 6 feet long (reported up to 10 feet long) and are either parabolic or linear
- careful design is needed for drainage



Potential Impacts:

- no effect on access
- speeds are reduced, but usually to a higher crossing speed than at speed humps (typically between 25 and 27 miles per hour)
- traffic volumes have been reduced on average by 12 percent depending on alternative routes available
- collisions have been reduced on average by 45 percent on treated streets (not adjusted for traffic diversion)
- reported to increase pedestrian visibility and likelihood that driver yields to pedestrian

Emergency Response Issues:

- typically preferred by fire departments over 12 to 14-foot speed humps
- generally less than 3 seconds of delay per hump for fire trucks

Typical Cost:

- approximately $2,500 (in 1997 dollars) for asphalt tables; higher for brickwork, stamped asphalt, concrete ramps and other enhancements sometimes used at pedestrian crossings

---

SPEED HUMP | SPEED TABLE | RAISED INTERSECTION | CLOSURE

NEIGHBORHOOD TRAFFIC CIRCLE | CHICANE | CHOKER | CENTER ISLAND NARROWING

Institute of Transportation Engineers
1099 14th Street, NW, Suite 300 West
Washington, DC 20005-3438 USA
Telephone: +1 202-289-0222 | Fax: +1 202-289-7722
Send comments to webmaster@ite.org

APPENDIX D

Results of Vehicle License Plate Survey at Four Stations along Route 53

INTRODUCTION[1]

The purpose of the Route 53 license plate survey was twofold: (1) to identify the profile of the towns of origin of the roadway's users, and (2) to determine whether Route 53 serves as a long-distance commuter facility.

This planning application consists of recording the license plates (via a tape recorder or a video camera) and matching them against the most recent Massachusetts Registry of Motor Vehicles (RMV) file, which lists the town where a registered vehicle is garaged. Another element of the application matches the plates observed at a given station with those at each of the rest of the stations to find the percentage of vehicles that pass through two or more stations.

DATA COLLECTION

Data were collected on Wednesday, October 10, 2001, between 7:00 and 9:00 AM, in the northbound direction of Route 53. The time period and direction were selected in order to capture the commuting pattern along Route 53 for the peak direction during the peak period. The four selected observation stations were:

1. Duxbury, north of Autumn Avenue (3.2 km, or 2 mi, north of the southern terminus of Route 53)
2. Hanover, north of East Street (12.9 km, or 8 mi, north of Station 1)
3. Norwell, north of Grove Street (6.8 km, or 4.25 mi, north of Station 2)
4. Weymouth, north of Federal Street (7.6 km, or 4.75 mi, north of Station 3, and 4.8 km, or 3 mi, south of the northern terminus of Route 53)

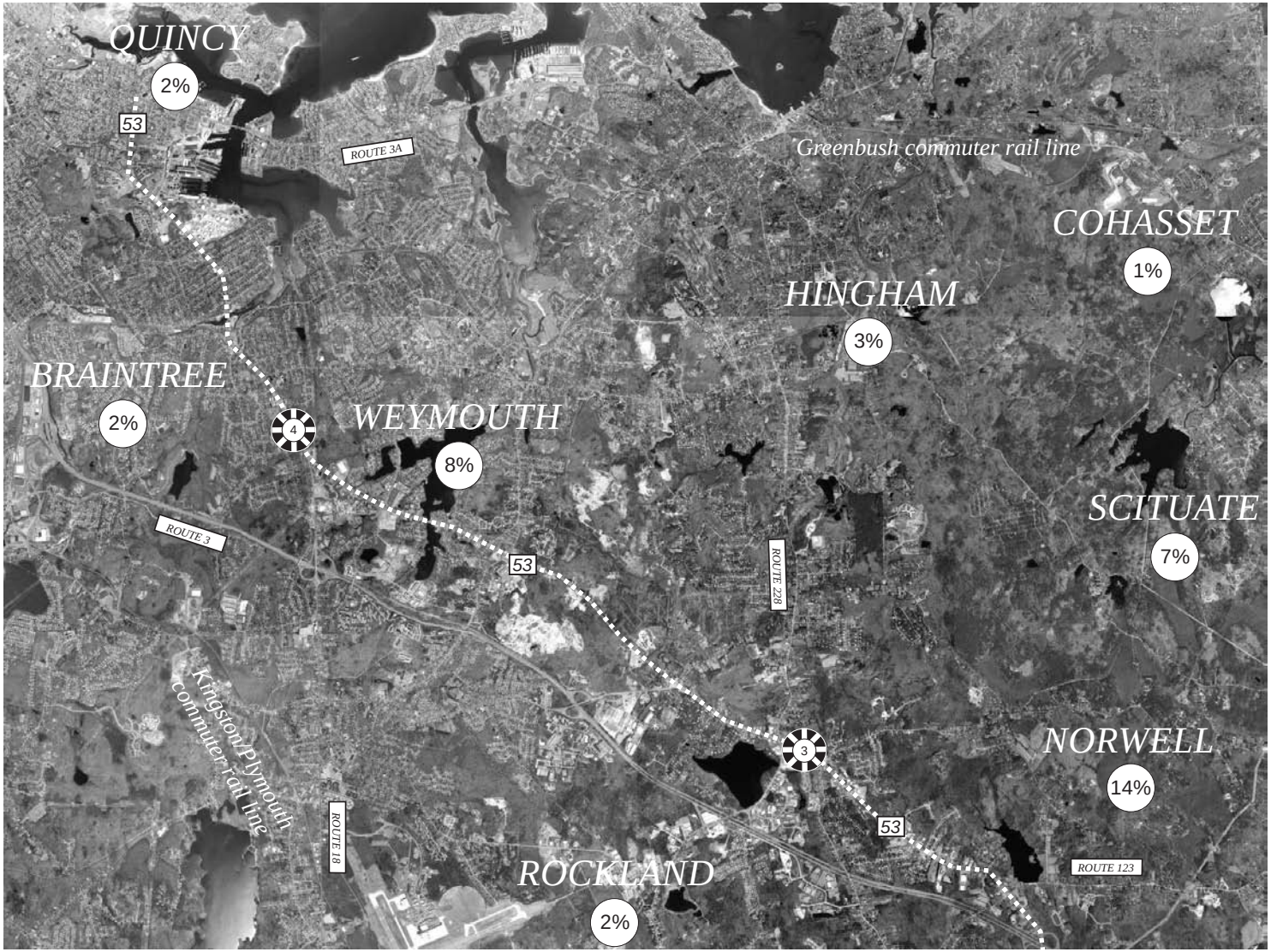
Figure D-1 shows the Route 53 corridor, the location of the four survey stations, and the percentage of total matched license plates whose origins match towns in the immediate vicinity of Route 53.

RESULTS OF LICENSE PLATE MATCH USING THE RMV FILE

Total Number of Matched Vehicles at Four Stations

A total of 4,503 license plates were recorded at the four stations. Of these, 3,159 (70%) were successfully matched to the RMV town-of-origin file. Of the matched plates, 2,489 (79%) were from towns that contributed 2% or more each; 1,918 plates (61%) were from the nine abutting towns in the Route 53 corridor. Following is the breakdown of the 2,489 plates recorded at the four stations, by (2%+) town.

[1] Appendix D is based on a memorandum distributed to the Route 53 Corridor Advisory Group, entitled "Results of Vehicle License Plate Survey at Four Stations along Route 53," April 1, 2002.



Station 4: → north of Federal St (Weymouth)

Station 3: → north of Grove St (Norwell)

CTPS

Route 53 Corridor Transportation Plan

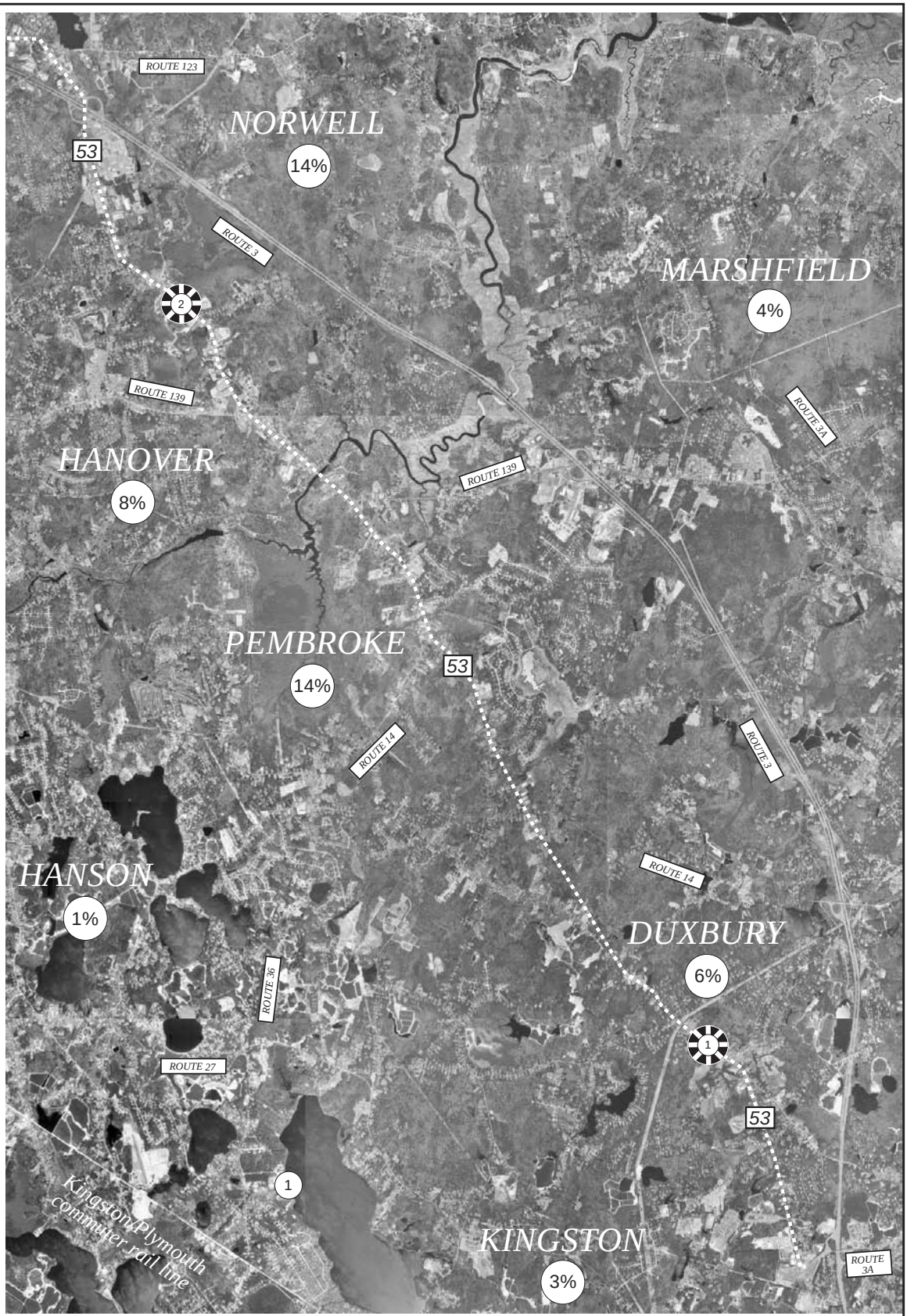
N

Aerial photo source: MassGIS and MIT

FIGURE D-1a
Route 53 Corridor License Plate Survey Results

4 **License plate survey station**

14% **Total matched license plates on Route 53, % by town of origin**



CTPS

Route 53 Corridor Transportation Plan

N

Aerial photo source: MassGIS and MIT

FIGURE D-1b
Route 53 Corridor License Plate Survey Results

4 **License plate survey station**

14% **Total matched license plates on Route 53, % by town of origin**

Town	Matched Vehicles	Percent of All Towns
Pembroke	**457**	**14%**
Norwell	**433**	**14%**
Hanover	**259**	**8%**
Weymouth	**255**	**8%**
Scituate	236	7%
Duxbury	**188**	**6%**
Marshfield	119	4%
Kingston	**103**	**3%**
Plymouth	94	3%
Hingham	**91**	**3%**
Quincy	**73**	**2%**
Boston	70	2%
Braintree	**59**	**2%**
Rockland	52	2%
All 2%+ Towns	2,489	79%

Note: Entries in **bold** in the tables denote towns abutting Route 53.

The following sections describe the town-of-origin breakdown of matched vehicles by station.

Matched Vehicles, Station 1, Duxbury

The 7:00–9:00 AM northbound traffic volume at this location was 590 vehicles; 469 license plates were recorded. Of the recorded plates, 349 (74%) were successfully matched to a town of origin, 269 plates (77%) had town origins with 2% or more of the Station 1 matched plates. The nine abutting towns accounted for 228 (65%) of the matched plates. The following table shows the breakdown of the 269 plates recorded at Station 1, by (2%+) town.

Town	Matched Vehicles	Percent of All Station 1 Towns
Duxbury	**130**	**37%**
Kingston	**56**	**16%**
Plymouth	38	11%
Pembroke	**29**	**8%**
Marshfield	10	3%
Boston	6	2%
Station 1, 2%+ Towns	269	77%

Note: Entries in **bold** in the tables denote towns abutting Route 53.

Matched Vehicles, Station 2, Hanover

The 7:00–9:00 AM northbound traffic volume at this location was 1,890 vehicles; 1,424 license plates were recorded. Of the recorded plates, 1,003 (70%) were successfully matched to a town of origin, 799 plates (80%) had town origins with at least 2% of the Station 2 matched

plates. The nine abutting towns accounted for 682 (68%) of the matched plates. The following table shows the breakdown of the 799 plates recorded at Station 2, by (2%+) town.

Town	Matched Vehicles	Percent of All Station 2 Towns
Pembroke	**345**	**34%**
Hanover	**123**	**12%**
Norwell	**84**	**8%**
Duxbury	**44**	**4%**
Marshfield	44	4%
Kingston	**35**	**3%**
Halifax	32	3%
Hanson	20	2%
Boston	19	2%
Plymouth	19	2%
Rockland	17	2%
Scituate	17	2%
Station 2, 2%+ Towns	799	80%

Note: Entries in **bold** in the tables denote towns abutting Route 53.

Matched Vehicles, Station 3, Norwell

The 7:00–9:00 AM northbound traffic volume at this station was 2,240 vehicles; 1,601 license plates were recorded. Of the recorded plates, 1,174 (73%) were successfully matched to a town of origin, 956 plates (81%) had town origins with 2% or more of the total at Station 3. The nine abutting towns accounted for 647 (55%) of the matched plates at this station. The following table shows the breakdown of the 956 plates recorded at Station 3, by (2%+) town.

Town	Matched Vehicles	Percent of All Station 3 Towns
Norwell	**330**	**28%**
Scituate	207	18%
Hanover	**105**	**9%**
Pembroke	**58**	**5%**
Hingham	**50**	**4%**
Marshfield	50	4%
Weymouth	**48**	**4%**
Plymouth	25	2%
Boston	23	2%
Cohasset	21	2%
Braintree	**20**	**2%**
Quincy	**19**	**2%**
Station 3, 2%+ Towns	956	81%

Note: Entries in **bold** in the tables denote towns abutting Route 53.

Matched Vehicles, Station 4, Weymouth

The 7:00–9:00 AM northbound traffic volume at this station was 2,230 vehicles; 1,009 license plates were recorded.[2] Of the recorded plates, 633 (63%) were successfully matched to a town of origin, 450 plates (71%) had town origins with 2% or more of the total at Station 4. The nine abutting towns accounted for 361 (57%) of the matched license plates at this station. The following table shows the breakdown of the 450 plates recorded at Station 4, by (2%+) town.

Town	Matched Vehicles	Percent of All Station 4 Towns
Weymouth	**192**	**30%**
Quincy	**37**	**6%**
Hanover	**28**	**4%**
Hingham	**27**	**4%**
Braintree	**26**	**4%**
Pembroke	**25**	**4%**
Boston	22	3%
Rockland	20	3%
Abington	18	3%
Norwell	**17**	**3%**
Marshfield	15	2%
Plymouth	12	2%
Randolph	11	2%
Station 4, 2%+ Towns	450	71%

Note: Entries in **bold** in the tables denote towns abutting Route 53.

Station-to-Station Matching

Station-to-station matching indicated that of the 4,503 recorded license plates, 193 (4%) were observed to pass through more than one station. The most common multiple recordings were:

- Hanover and Norwell, where 64 license plates were recorded at both stations
- Duxbury and Hanover, where 42 license plates were recorded at both stations
- Norwell and Weymouth, where 39 license plates were recorded at both stations
- 13 license plates were recorded at three different stations
- 1 license plate was recorded at all four stations

[2] The percentage of recorded plates at this station was affected by the high traffic volumes and the average vehicle speed that was higher than the average speed at the other three stations.

Summary and Conclusions

- Of all license plates recorded, 70% were matched to the RMV records. The percentage of matched vehicles varied by station, ranging from 63% to 74%. These match rates are considered to be acceptable.
- Of the successfully matched plates, 61% were from vehicles with origins within the nine towns that abut Route 53.
- 4% of the recorded vehicles were observed passing through two or more stations.
- From the above results, it appears that the majority of the vehicles at various points along Route 53 are from the abutting communities. Further, it appears that, regardless of the town of origin, commuters use Route 53 in the morning peak direction for just a short portion of the roadway. The implication of this observation is that the road is not a long-haul commuter road; rather, short portions of it are used as a means of accessing Route 3, employment sites abutting the roadway, or other employment sites reached via one of the many arterials and collector roads crossing Route 53.

APPENDIX E

Estimated Population, Employment, and Traffic Demand Growth in the Route 53 Corridor between 2000 and Buildout

INTRODUCTION[1]

CTPS has been asked to consider how full buildout[2] in communities abutting or near Route 53 would affect traffic demand. Estimating buildout population and employment is a component of this analysis. However, it is extremely difficult to make accurate population and employment projections beyond the currently used 25-year horizon, as there are many factors that cannot be controlled or accounted for. With this qualification in mind, an attempt was made to estimate theoretical buildout years for population and employment in the Route 53 corridor using MAPC's population and employment projections[3] and the Executive Office of Environmental Affairs (EOEA) buildout analyses.[4] These estimates are in no way definitive and should only be used for illustrative purposes.

POPULATION FORECASTS

The buildout analyses estimated additional population at buildout. Population growth rates between 2000 and 2025 were used to estimate the number of years to buildout year. The estimated population and buildout years are listed in Table E-1. Over half of the communities along Route 53 could reach population buildout before or right after 2025 if current growth rates continue.

EMPLOYMENT FORECASTS

The EOEA analyses list the additional commercial/industrial buildable square footage available before reaching buildout conditions. The number of employees can be estimated using ITE employee rates per 1,000 square feet of leasable floor space. However, the number of employees per square foot differs by business type. The following assumptions were made to estimate the number of employees at buildout and the year in which buildout would be reached.

- Department of Employment and Training (DET) data for 2000 for each corridor community and the average number of employees per square foot by job category that was used in several CTPS modeling projects were used to estimate the amount of square footage used by job category in 2000.
- The distribution of employees by job category was held constant and applied to the additional commercial/industrial square footage that would be used at buildout to determine the square footage used by job category.
- The average number of employees per square foot by business type was used to determine the number of additional employees per community at buildout.
- MAPC 2025 employment forecasts were used to determine the growth rate between 2000 and 2025. This growth rate was used to estimate the number of years to buildout.

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[1] Appendix E is based on a CTPS memorandum by A. Wilson, entitled "Estimated Population, Employment, and Traffic Demand Growth in the Route 53 Corridor Between 2000 and Buildout," September 4, 2003.

[2] Full buildout refers to the situation where, according to current zoning regulations, all developable land in a community has been developed to its maximum potential, and therefore cannot grow further in terms of population and employment.

[3] Based on MAPC's Metro Data Center, July 2001 (www.mapc.org).

[4] See http://commpres.env.state.ma.us.

TABLE E-1
Estimated Buildout Population and Buildout Year

City/Town	MAPC 2000 Pop	MAPC 2025 Pop	Change/Yr 2000–2025	EOEA/ MAPC Buildout Pop	Pop Change 2025 to Buildout	Years from 2025 to Buildout	Buildout Year
Study Area Communities							
Braintree	33,828	35,664	0.2%	35,367	-297	-4	2,021
Duxbury	14,248	18,673	1.1%	23,258	4,585	20	2,045
Hanover	13,164	16,994	1.0%	19,958	2,964	16	2,041
Hingham	19,882	22,664	0.5%	23,390	726	6	2,031
Kingston	11,780	17,037	1.5%	18,182	1,145	4	2,029
Norwell	9,765	11,127	0.5%	16,686	5,559	78	2,103
Pembroke	16,927	22,213	1.1%	21,610	-603	-3	2,022
Quincy	88,025	91,217	0.1%	89,752	-1,465	-11	2,014
Weymouth	53,988	55,125	0.1%	59,515	4,390	92	2,117
Other South Shore Communities							
Cohasset	7,261	8,332	0.6%	9,913	1,581	32	2,057
Hull	11,050	13,010	0.7%	11,777	-1,233	-15	2,010
Marshfield	24,324	28,978	0.7%	29,287	309	2	2,027
Rockland	17,670	20,660	0.6%	20,875	215	2	2,027
Scituate	17,863	19,444	0.3%	25,347	5,903	78	2,103
TOTAL	339,775	381,138	0.6%	404,917	23,779		

Estimated buildout employment and buildout years are presented in Table E-2. Buildout years range from 2005 to 2921.

TABLE E-2
Estimated Buildout Employment and Buildout Year

City/Town	MAPC 2000 Emp	MAPC 2025 Emp	Change/Yr 2000–2025	EOEA/ MAPC Buildout Emp	Emp Change 2025 to Buildout	Years from 2025 to Buildout	Buildout Year
Study Area Communities							
Braintree	30,319	35,571	0.6%	44,232	8,661	34	2,059
Duxbury	2,546	3,039	0.7%	2,640	-399	-20	2,005
Hanover	6,378	6,990	0.4%	12,275	5,285	154	2,179
Hingham	11,078	12,559	0.5%	16,513	3,954	55	2,080
Kingston	5,633	7,127	0.9%	19,627	12,500	108	2,133
Norwell	9,167	13,519	1.6%	10,854	-2,665	-14	2,011
Pembroke	4,772	6,471	1.2%	6,956	485	6	2,031
Quincy	46,567	59,030	1.0%	52,646	-6,384	-12	2,013
Weymouth	16,593	19,973	0.7%	39,125	19,152	91	2,116
Other South Shore Communities							
Cohasset	1,994	2,195	0.4%	5,059	2,864	217	2,242
Hull	1,207	1,252	0.1%	4,647	3,395	896	2,921
Marshfield	4,671	5,578	0.7%	23,318	17,740	202	2,227
Rockland	8,276	11,076	1.2%	19,821	8,745	50	2,075
Scituate	3,161	3,674	0.6%	4,044	370	16	2,041
TOTAL	152,362	188,054	1.1%	261,757	73,703		

TRAFFIC DEMAND GROWTH

The Route 53 Corridor Transportation Plan anticipates that traffic volumes in the northern portion of the corridor are expected to grow at the rate of 0.5% per year between 2000 and 2025, and those in the southern portion at the rate of 1.0% per year (see Appendix C-1 above). Table E-3 gives examples of potential increases in traffic at buildout using estimated growth rates of 0.5% per year for the communities in the northern portion of the corridor and 1.0% per year for communities in the southern section of the corridor.

CTPS collected license-plate data at four locations in the Route 53 corridor during the AM peak period in October 2001 (see Appendix D). License plates, collected for the northbound (peak) direction only, were matched with data from the Massachusetts Registry of Motor Vehicles to determine the communities in which vehicles are garaged. (The latter is a surrogate for town of origin.) These locations were used to estimate traffic growth at specific locations for two future years beyond 2025 — 2050 and 2100 — and for a maximum buildout year. Annual growth, 0.5% in the northern portion of the corridor and 1.0% in the southern portion, was

TABLE E-3

Estimated Traffic Growth: 2025 to Buildout Year

City/Town	Buildout Year Pop	% Traffic Volume Change 2025 to Pop Buildout	Buildout Year Emp	% Traffic Volume Change 2025 to Emp Buildout
Study Area Communities				
Braintree[1]	2,021	-2	2,059	17
Duxbury[2]	2,045	20	2,005	-20
Hanover[2]	2,041	16	2,179	154
Hingham[1]	2,031	3	2,080	27
Kingston[2]	2,029	4	2,133	108
Norwell[2]	2,103	78	2,011	-14
Pembroke[2]	2,022	-3	2,031	6
Quincy[1]	2,014	-6	2,013	-6
Weymouth[1]	2,117	46	2,116	45
Other South Shore Communities				
Cohasset[2]	2,057	33	2,242	217
Hull[2]	2,010	-16	2,921	896
Marshfield[2]	2,027	2	2,227	202
Rockland[2]	2,027	2	2,075	50
Scituate[2]	2,103	78	2,041	16

[1] 0.5 % growth per year

[2] 1.0 % growth per year

extended through 2050 and 2100. CTPS uses the factor of employment contributing two-thirds to traffic growth and population contributing one-third. If either population or employment reached buildout before one of the buildout years, its contribution was held constant while the other continued to grow.

Some of the vehicles were from outside the Route 53 corridor. Since information was not developed for non-corridor communities, the proportion of traffic from corridor communities to that from non-corridor communities was held constant and was used to estimate the total traffic at a location for each future year. Buildout volumes were estimated by increasing a corridor community's contribution to traffic until both population and employment buildout were reached and then holding the contribution constant until every corridor community reached buildout. Table E-4 and the attached charts present observed 2001 AM peak period northbound traffic volumes and estimated future demand at the four count locations. Please note the important estimation assumptions listed at the end of the table and the charts.

TABLE E-4

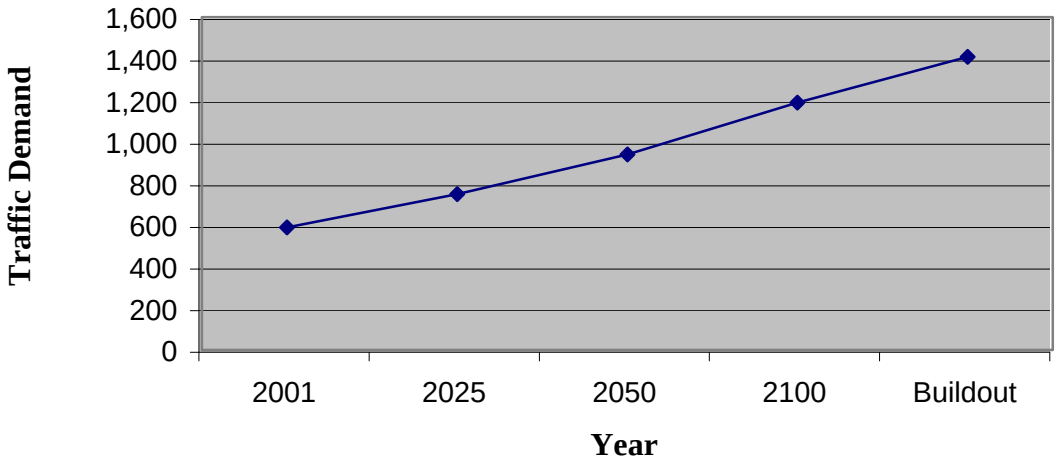
Estimated AM Peak Period[1] Traffic Demand (Northbound Only): 2025 to Buildout Year

	Estimated Traffic Demand				
Route 53 Count Locations	**2001[2]**	**2025**	**2050**	**2100**	**Buildout**
Duxbury, North of Autumn Avenue	590	750	940	1,190	1,410
Hanover, North of East Street	1,890	2,400	2,660	3,060	4,000
Norwell, North of Grove Street	2,240	2,790	3,190	3,870	4,920
Weymouth, North of Federal Street	2,230	2,590	2,870	3,550	4,190

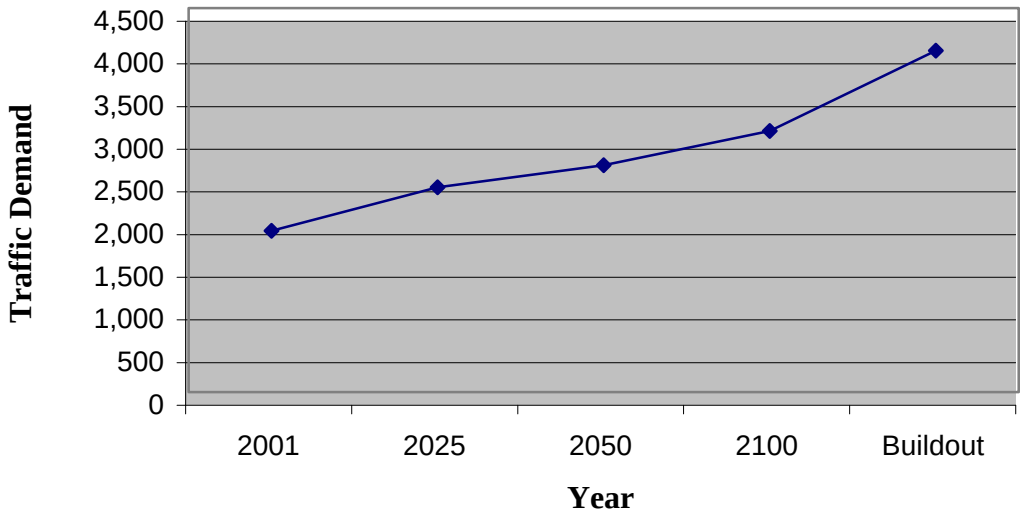
[1] AM peak period is 7:00–9:00 AM
[2] Observed northbound volumes

Assumptions:
The proportion of corridor to non-corridor traffic held constant.
Traffic continues to grow at 0.5% or 1.0%.
Unconstrained volumes.
Commuters will not divert to other roads, switch to other modes, shift time of travel, or telecommute.

Duxbury, North of Autumn Avenue:
Potential AM Peak Period Traffic Demand



Hanover, North of East Street:
Potential AM Peak Period Traffic Demand



Assumptions:

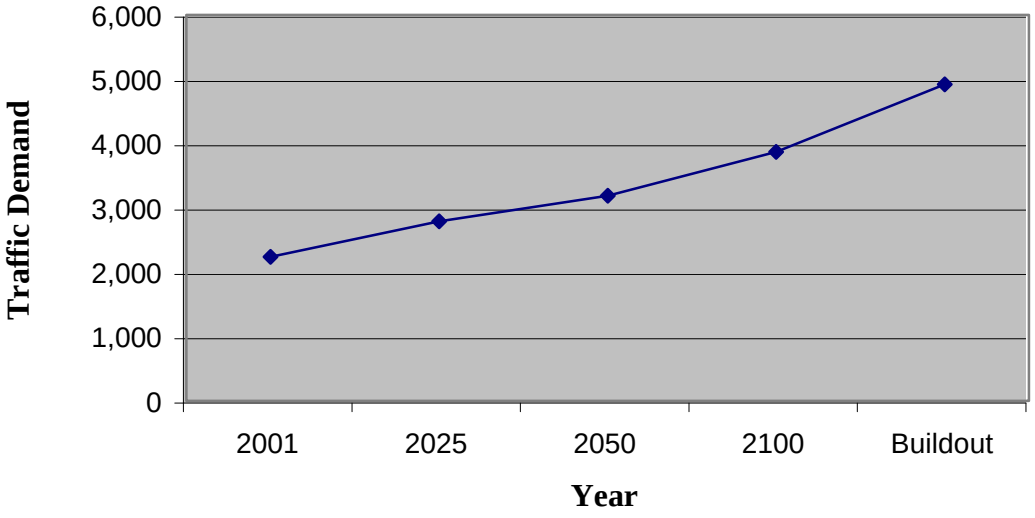
The proportion of corridor to non-corridor traffic held constant

Traffic continues to grow at 0.5 or 1.0%

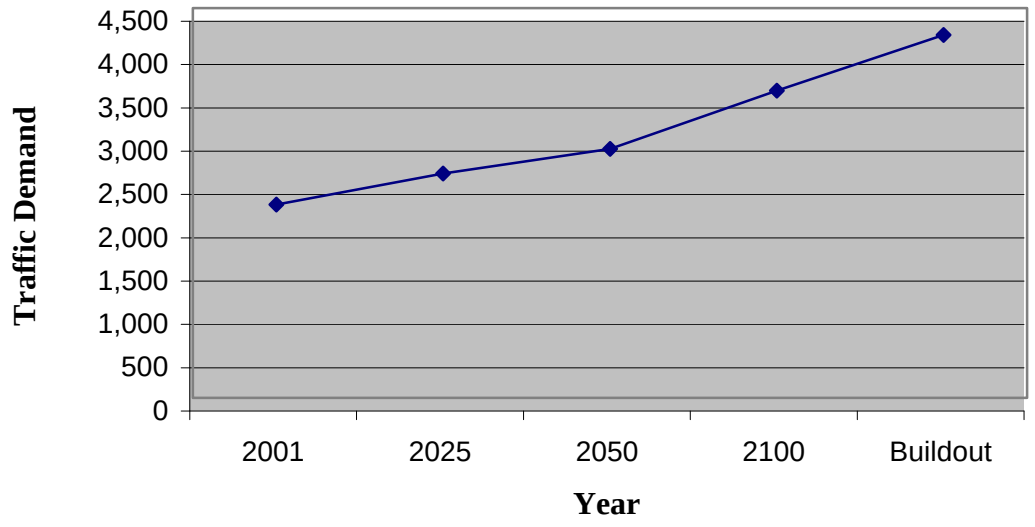
Unconstrained demand

Commuters will not divert to other roads, switch to other modes, shift time of travel, or telecommute

Norwell, North of Grove Street:
Potential AM Peak Period Traffic Demand



Weymouth, North of Federal Street:
Potential AM Peak Period Traffic Demand



Assumptions:

The proportion of corridor to non-corridor traffic held constant

Traffic continues to grow at 0.5 or 1.0%

Unconstrained demand

Commuters will not divert to other roads, switch to other modes, shift time of travel, or telecommute

APPENDIX F

Participants in the Study

INTRODUCTION

The Route 53 Corridor Transportation Plan Advisory Group members actively involved in the meetings and instrumental in the steps of developing the plan were:

Braintree town officials
Duxbury town officials
Hanover town officials
Hingham town officials
Kingston town officials
Norwell town officials
Pembroke town officials
Quincy city officials
Weymouth town officials
Braintree police department
Duxbury police department
Hanover police department
Hingham police department
Kingston police department
Norwell police department
Pembroke police department
Quincy police department
Weymouth police department
MassHighway–Planning
MassHighway–District 4
MassHighway–District 5
Metropolitan Area Planning Council
Old Colony Planning Council
South Shore Coalition
State Sen. Robert Hedlund
State Rep. Garrett Bradley
State Rep. Bob Nyman

The group met on the following dates. All of the meetings were held at the Norwell town offices.

2001 March 27

2002 April 2

2003 January 28, September 23

In addition, CTPS met with local officials in all nine communities abutting Route 53 during the development of the plan. These meetings were held mostly during the first year to request data and to solicit information regarding individual communities' transportation concerns; subsequent meetings were held with officials of a number of the communities on an as-needed basis.